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# SELECTIONS

FROM

# THE RECORDS

OF THE

# MADRAS GOVERNMENT.

PUBLISHED BY AUTHORITY.

## No. XXIX.

## REPLIES TO THE COLLECTIVE MEMORANDUM

## ON PUBLIC WORKS.

IN THE

## MADRAS PRESIDENCY.

MADRAS:

PRINTED AT THE ASYLUM PRESS, BY WILLIAM THOMAS.

1856.

ARCHIVES
15918

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# LETTER FROM H. STOKES, ESQ., ACTING COLLECTOR OF MADRAS, TO SIR H. C. MONTGOMERY, BART., CHIEF SECRETARY TO GOVERNMENT, DATED 5TH OCTOBER 1854. No. 24.

SIR,

1. I have the honor to acknowledge the receipt of the Extract Minutes of Consultation, No. 413, Department of Public Works, dated 28th September, forwarding the printed Memorandum mentioned therein, and calling for opinion of Collectors regarding such projects as affect the Districts under their respective charge, with any suggestions for the improvement of those Districts they may desire to offer.

2. Of the works suggested in the Collective Memorandum, two only, I believe, affect the locality under my present charge. The Coast Canal, and the supply of water for the Presidency.

3. The following observations occur to me as regards the Canal.

Too much reliance must not be placed on tidal supplies of water. The last season has shown how precarious they are. From the low level of the Pulicat and Ennore Lagoons, the most important traffic on the Canal has been interrupted from the beginning of March to the end of September, and during the most of this time I believe they have received no water from the sea. The bars were reported to be closed in the middle of April, and still continue so. Special attention should be directed to the possibility of keeping the Ennore bar open; otherwise the new lock will in a measure fail of its object.

4. Attention must be paid to keep in operation some more effectual means of preventing the Canal from being choked, than have as yet been resorted to. Upwards of Rupees 14,500 have been paid for removing deposit from the bed between the months of January and July last, yet, I fear, the work is done less effectually than could be wished, and there is no security that the mud will not be washed in again on the first occasion that the flats on the west of the Canal between Ennore and Madras may be flooded. Indeed, I believe there is a constant drift of earth into the Canal during the dry

weather, as the flats are for the most part without turf or brush-wood. It seems a question for professional consideration whether it might not be worth while to construct a wall to line the west-bank of the Canal for four or five miles from Madras, and raised a little above the level of the plain, so as at once to protect the bank, and shut out the flood deposits.

5. So soon as the Canal is again in its full operation, it will be desirable to revert to the use of the dredge.

6. With the general views expressed upon the project for bringing water to Madras, I entirely concur. Should it succeed, I would then suggest that possibly some of the Tanks in Madras may be dispensed with. In any case I think the Egmore, commonly called the Spur Tank, should be applied to some other purpose. From its high level, it can hold little water. There is very little land at any time irrigated by it. Some of this land especially that near the Male Asylum, is in a very inconvenient locality for paddy cultivation; and if the salubrity and comfort of the neighbourhood were the primary object, should be drained and used for building. The other land now depending on the Tank may possibly be otherwise provided for by the new channels. The bed of the Spur Tank if not required as a reservoir, would offer perhaps a suitable site for a botannical garden, or any other public purpose.

7. Adverting to my long connexion with Guntoor and the short time that my locum-tenens has had it under his charge, I will venture to add the suggestions that occur to me on those points which affect that Province, though the terms of the order of Government strictly taken, do not require me to do so.

8. As regards roads, the Memorandum does not advert to the great importance of accelerating our Letter Post. If the importance of rapid interchange of intelligence has in public opinion fully justified the construction of Electric Telegraphs, it seems unaccountable why so little has yet been done to expedite the transmission of letters on the most important routes in India—those which connect the Supreme Government with the Second Presidency, and the latter place with the capitals of Central India, Hyderabad, Nagpoor and Agra.

9. There are two ways in which the road for runners may be so much improved as to raise the average speed by 1 or 1½ miles an hour. That is, first, during the monsoon to use a line of road sufficiently inland to keep clear of the swamps and estuaries. Thus from Ongole to Guntoor I believe time would be saved by carrying the mails on a line about 10 miles west of the direct road. Second to provide at least a foot bridge for *every* River, Nullah, and Channel. I should suppose that the Screw pile bridge such as has been con-

structed at Colonel Cotton's instance along side of the Wallajah bridge would answer excellently at a comparatively trifling cost, and that such bridges will be less liable to destruction from floods owing to the much resistance they offer.

10. The proportion of the delay of the mails which in the rains would be obviated by a complete set of bridges, is much greater than is supposed. During the wet weather in 1852, the mail from Madras to Guntoor, a distance of 260 miles, was sometimes 5 days late, or nearly 8 days on the whole. Most of the delay was caused by unfordable streams. Of course the road ought to be made practicable as soon as possible for mounted Postmen, or light mail carts. Connected with this topic I would observe that the original idea of adding bridges to the Anicuts at Bezwara and Dowlaisweram seems to have been lost sight of. But whatever risk or expense might attend the construction of bridges capable of sustaining the traffic, I should suppose such considerations would not operate against the erection of light-foot bridges, and this would greatly expedite the mails, to say nothing of the convenience of travellers.

11. The system I have supposed ought certainly to include a bridge over the Kistnah at Pondigul. The importance of this work no less as a postal advantage than in a military point of view, and with reference to the large number of travellers along the central road from north to south through the Peninsula fully warrants this step.

12. The speed of the mails has now acquired a new and very weighty accession of importance by the cheap postage. The profits of this will depend much on the rate at which letters are carried.

13. By an inadvertent omission, as I should suppose the Memorandum is silent regarding the Kistnah Navigation and except below Bezwara, its irrigation also I am not in a position to speak of the practicability of navigating the Kistnah to the sea. But there can be no question as to the importance of doing all that can be done to facilitate its navigation in all practicable portions. Thus timber and bamboos have always been conveyed from the heart of the Nuggur Division to Hurryhur and several places in Bellary, and as far as I can judge they can go as far as Kurnool. Assuming that the Channel between the Palnaud and Chintapilly is hopeless, yet the latter place might be made an important port for all the inland traffic which might be sent thence by boat either to Masulipatam or Nizampatam.

14. And I would here notice what a great convenience to the inland Districts would be a large Salt store, either public or private at Chintapilly.

15. With regard to irrigation and the storing of water in Guntoor, I would mention that though I am not aware of any professional officer having directed inquiry to the subject with any practical object, I can speak to the existence of 3 or 4 sites of large Tanks in the Palnaud and Innaconda, and I am persuaded many more exist. It is however important to bear in mind that reservoirs on a large scale for inland, if attempted at all must be done effectually at whatever cost. If a Tank in such a position goes, it may, and generally does, destroy all others that lie in its course, and may sweep away whole villages with their cattle and inhabitants.

16. But it is only necessary to secure the strength of the Bund, and the sufficiency of the outlet or surplus channel.

17. For irrigation the small streams in the west of Guntoor, as the Gundlacumma which flows from the Cumbum tanks, and the Nagalier in the Palnaud might be turned to much greater account than they are at present. At all events they deserve examination.

18. So soon as the Guntoor Channels are in operation, it will probably be found best to convert all the lower Tanks in the Delta into rice fields, and to remove all the obstructions which, to supply them, have been placed in those Channels that will now be used for drainage.

I have, &c.,

(Signed) H. STOKES,
*Acting Collector.*

MADRAS:
*5th October*, 1854.

## LETTER FROM F. N. MALTBY, ESQ., COLLECTOR OF CANARA, TO THE CHIEF SECRETARY TO GOVERNMENT, DATED 28TH OCTOBER 1854. No. 25.

SIR,

I have the honor to acknowledge the receipt of a "Collective Memorandum on Public Works in the Madras Presidency," circulated with directions to submit my opinion as to the method in which the interests of this District can be best advanced by means of Public Works.

2. To this I hasten to reply, and my object will be to offer only such suggestions as appear to me to be strictly practical. I believe that what the Government wish to learn is, what measures of public improvement can be at once carried out, either with our present means, or with such additional aid as can at once be afforded.

3. I shall not therefore offer any suggestions as to the possibility of constructing railroads in this district, or other questions which must lie over until much more Engineering skill is available than we now possess; the works which I shall suggest can be immediately undertaken.

4. The great wants of this District are,

1st. Ghâts.
2d Roads.
3d. Bridges.
4th Canals.
5th. Harbour improvements.
6th. Light Houses, and
7th. The means of instruction in the Arts and Engineering.

5. To show what is wanting it is necessary to refer to what has been already done, and I propose under each of the above heads to shew in as few words as I can, the state of our progress, and I hope that by means of a Map for each subject I may make the present condition of the District clear.

6. Before going further I would beg to state that the necessity of the works which I suggest being admitted, the order in which they can be best

taken up will depend upon many local circumstances, and I believe that the greatest benefit will result from giving a wide discretionary power to the officer in charge of the District. If the works are sanctioned and I am empowered to disburse the amount as soon as I am assured that they can be executed without waste of the public money, I feel certain that a great degree of activity will prevail in this department. When it is well known that if a Native qualifies himself for employment there is employment for him, a class of superior workmen and superintendents will soon spring up.

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## GHATS.

No. 1.
* Sampajee,
Munjeerabad,
Devamunny,
Arbyle,
Agoomby,
Koloor,
† Neelcoond,
Singawaree,
Malay-manay or Guersippah.
‡ Wastara,
Mallody.

7. The annexed Map shews the line of the Ghât mountains separating Canara from the table land of Mysore. The passes through the mountains already constructed and bridged, or for bridging which sanction has been received are shewn in red;* those constructed but not bridged in blue,† those traced and practicable for bullocks in green.‡

8. The foot note to the Map shews the order in which these passes have been opened, and the amount expended upon each. In the Appendix to their report on Public Works the Commissioners printed a letter in which I shewed how amply every pass made had repaid its cost—and this cannot but be the case when on one side of the mountains is a table land of great fertility and on the other a sea board with busy trading ports. The exchange of rice and salt alone pays for the roads.

9. Recent experience has proved the following facts. That at the rate of about 400 or 450 Rupees per mile a trace can be made on scientific principles, and opened to the extent of 5 or 6 feet, being sufficient to allow of loaded bullocks using it. When so made the traces are immediately used in supercession of the old Ghâts, which are the beds of mountain-torrents. When so traced the Native Road Superintendents of this District are competent to convert them into good cart roads—at the rate of about 1,000 Rupees per mile. These can be afterwards bridged at a very cheap rate with timber bridges on stone piers calculated to last for 20 or 30 years.

10. Thus the Malay-manay trace was opened by Lieutenant Walker

in 1852 for 5,000 Rupees, being 16 miles in length, and was used all last year, by all the trade. The Wastara Ghât was traced last year by Dassana the Head maistry of Mysore, and will this year be made practicable for bullocks at 450 Rupees per mile.

11. Again a Neelcoond trace made by Captain Collyer fifteen years ago, and abandoned in favor of the Devamunny Ghât, and was last year adopted to relieve the Devamunny Ghât and converted into a cart road by our Road Superintendent Juan Machada, at the rate of 1,000 Rupees per mile (great difficulties being encountered and overcome.) Machada was aided by Mr. Hall the Sub Collector.

12. In the past season no less than three traces were made and the Neelcoond Ghât was opened.

13. With reference then to the Ghâts of this District my recommendation is, that while the unbridged Ghâts are being bridged and the traces are being converted into roads, other traces should be made with as little delay as possible, and that, I may have authority to disburse the sum of Rupees 450 per mile on any trace which the Civil Engineer can undertake, or for which in communication with the authorities of Mysore, adequate superintendence can be obtained (as in the case of the Wastara Ghât.)

14. I would further request that after any such trace has been inspected and approved by the Civil Engineer or other competent person (the Collector and Civil Engineer concurring in the measure), I may be authorized to disburse the sum of 1,000 Rupees per mile for converting the trace into a road.

15. Of bridging the Ghâts I shall speak when I come to the subject of bridges generally.

16. I indicate on the Map in yellow the traces still most urgently required. They are Idagoonjee and Mullapoor (included in the budget.)

*Bilghi and Santagul* (urgently petitioned for by the Bilghi merchants.)

*Butkul and Anantapoor.* (The subject of constant urgent petitions from the traders of Butkul.)

*Hyder Ghur.*—Formerly the great road to Nuggur and still one of the most important lines.

*Mâla Ghât.*—Much solicited by the people of Kalasa who trade with Karkul.

*Bellarypett and Mercara.*—The people of the track below the Ghât resort every week to the bazar of Mercara, and a trace up the steep mountain would be a great boon to them, and improve the trade greatly.

17. These traces have to be made. Of those made Singawaree, Guersippah, Wastara, Mallody have to be made into roads, and all, except Sampajee and Devamunny, have to be bridged. But the budget of Public Works having submitted as much as we have the means of executing under scientific supervision. I need not offer any suggestion at present beyond those submitted above, which I beg to repeat, viz., that Government will authorize me to expend 450 Rupees per mile whenever a trace can be undertaken, and 1,000 Rupees per mile whenever a trace has been made, and the Collector and Civil Engineer concur in its conversion into a road.

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## ROADS.

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18. In a former report* I have had occasion to describe the peculiarities of this District with reference to roads. The principal peculiarity is, that while the soil is most favorable for making cheap roads, the surface of the country is such, that unless a road is made no cart can possibly be used. In fifteen miles there may not be six obstructions, but those six are insurmountable, by any means short of the actual construction of a road. For this reason, beyond Mangalore, carts either for traffic or agricultural purposes were entirely unknown fifteen years ago. They were next used only for trade on the Sampajee, and subsequently on the Devamunny line, and only within the last four years have they been used off those lines, but they are now coming into use whenever the roads are sufficiently complete.

* To the Board of Revenue D. P. W., dated 24th June, 1852.

19. Much progress has been made in the last three years in the construction of cross roads and great benefit has been derived from them, but in a District, such as I have described, the adoption of carts in supersession of men and bullocks must depend upon the rapidity with which the cross roads are completed. I conceive the object to be sought is to complete, with the least possible delay, a net-work of cheap practicable roads over the whole District, at the same time that the larger lines are made into first class roads, thoroughly bridged under the care of scientific men.

20. For the last three years we have acted upon this principle, and it is almost incredible how much has been done for the small sum of 6,000 Rupees a year, which the Government placed at my disposal. In each of the divisions of the District some improvement has been made under the zealous care of Mr.

Hall, Mr. Silver, Mr. Hudleston, Mr. Chase, &c., at the same time that the Engineer's Department were fully occupied.

21. The annexed Map* shews the existing roads. It is a table which I have had printed for the use of travellers. I have shewn in the margin the degree of completeness in which the roads are to be found.

* No. 2.

22. I have hitherto classed the roads of the District as :

1st. Trunk Roads.
2d. District Roads.
3d. Talook Roads.
4th. Village Roads.

and this classification is I think as convenient as any other.

23. The suggestion made in the Collective Manual, of constructing cross roads on the principle of connecting all Cusbahs, seems to me to be admirably simple and practical. In this District the Stations of Peishcars must be considered as Cusbahs, and there are two other points which determine the direction of our roads, these are the termini of the Ghâts, and the navigable heads of the rivers.

24. The next Map* shews the net-work of roads which would exist if constructed upon this principle, combining those already opened and those now required. The Trunk Roads are marked in blue, District Roads in red, and the Talook Roads in green. The rivers are painted in light blue as far as navigable.

* No. 3.

25. I call District Roads the main lines traversing several Talooks executed on regular sanction, or which, though executed as Talook Roads, are now being enlarged into District Roads.

26. The next Map* exhibits in two colors the roads made, and those unmade; whether sanctioned, or entered in the budget, or still unprovided for.

* No. 4.

27. The above Maps include as District Roads the Ghâts named under the first head.

28. Thus classified the state of the roads of Canara, appears to be nearly as follows :

| | Made. | Unmade. |
|---|---|---|
| Trunk Roads ...... ............... | 102½ Miles......... | 9 Miles. |
| District Roads....................... | 545 „ ......... | 242 „ |
| Talook Roads ...................... | 81¼ „ ......... | 358 „ |
| Village Roads ...................... | Extent unknown. | |

29. On this most important subject I have to offer the following suggestions.

30. The Trunk and District Roads already sanctioned and those entered in the budget are calculated to occupy all the Executive Engineer Officers for a considerable period. To these large works and their bridges the attention of all the Superintendents should be turned. But in the mean while very much can be done, as it has been done in the past three years, by Native Superintendents acting under the orders of the Revenue Officer of each Division. At the rate of about 350 Rupees per mile and often for much less, excellent roads have been made, and I know no means by which our roads can be so cheaply and so quickly extended as by the course already adopted. In each Division we are now training men to the work, and none are so competent to determine the works most required, or the best moment for executing them, as the Officer in charge of the Division. It gives him additional interest in his charge and brings him into direct contact with the people, in the way most calculated to increase his influence, that of supplying their wants and aiding their trade.

31. I have therefore to request that while the larger works are in progress, I may be authorized to disburse the sum of 20,000 Rupees annually on such of the Talook and Village Roads as can at once be opened out. This will give about 5,000 Rupees to each division of the District.

32. The Coast Road requires a great deal of improvement especially at the Ferries, but on this subject I need only offer the plain suggestion that the Ferry Fund, amounting to about 10,000 Rupees a year be declared available for improving this line of road, by road repairs, jetties at the rivers, bridges over the nullahs, Moosaferkhanas at the ferries, where travellers are often detained in the rain, and other improvements, the proper application of a local tax, the very existence of which proves the difficulties with which the trade of the country has to contend.

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## BRIDGES.

33. Two roads only, the Sampajee and the Devamunny, are fully bridged and the Munjerabad line is partially so. Every one of our roads must be bridged in succession. The number of bridges required is immense. The paucity of Artificers and the difficulty of executing masonry arches in our jungles with the treacherous nature of our laterite, has naturally pointed to the use of our splendid timber for spanning our torrents with bridges quickly and

cheaply constructed. Lieut. Walker has given plans of the simplest kind, and I have obtained working models of those best adapted to nullahs of different spans. These can be executed by the workmen of the country and several have already been so executed.

34. The object is to bridge all our roads on this cheap system with as little delay as possible. Those already estimated and sanctioned, or submitted for the Arbyle line, the Neelcoond line, the trunk line of Munjerabad, the Jalsoor road and the Seedapoor line, and those about to be submitted for the Agoomby roads, will employ all the Superintendents and Artificers of the District for some time to come.

35. But I beg to suggest that when the means are available and the Collector and Civil Engineer concur in the necessity of bridging any of the streams upon the roads provided for in the last section, I may be authorized to disburse the necessary amount not exceeding Rupees ——— per annum, on bridges not exceeding 100 feet in span. Larger works should, I think, be submitted for higher authority.

36. I would here beg to observe that while I advocate a cheap and rapid system of providing for the wants of the District generally, I strongly urge that at the same time works of superior skill, of permanence and beauty, should be in progress. There are still the scattered descendants of the stone cutters who executed the beautiful granite works of Moodbiddery; and to revive this almost lost art, to introduce that of brick-making, and to place before the eyes of the people works combining utility and elegance should, I conceive, engage the attention of the principal Engineer. Something in their public works beyond the mere cost of doing what is absolutely necessary in the cheapest way should, I conceive, in this country, as in every civilized nation, form a portion of the means by which the Government acts upon the minds of the people. In well selected sites such works under the Chief Engineer should form the school of our Artificers.

37. The introduction of floating bridges as a means of passing some of our tidal rivers has been long and urgently advocated by me.

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## CANALS.

38. The first survey with the view to the construction of a canal to connect two of the back-waters has just been completed. A work of four miles in length will give connected water-carriage for 40 miles. This is

entered in the budget. The portions of the District to which it is probable that further works of the kind are applicable is indicated in the next Map.

39. These canals will be constructed generally in low and sandy soils. The direction of the canal being indicated and the cost of the work adjusted by measurement, very ordinary superintendence will suffice. The value of those canals will be immense and it is desirable that they should be extended as quickly as possible.

No. 6.

40. My suggestion is that the survey having been made and the Civil Engineer and the Collector being satisfied that the work can be executed at a rate not exceeding Rupees 1,500 per mile, including superintendence I may be authorized to disburse this amount in co-operation with the Civil Engineer.

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## HARBOUR IMPROVEMENTS.

41. The construction of a Quay in front of the Custom House at Mangalore and of a Jetty at Honore, are the only works of this nature hitherto undertaken. The utility of these is most apparent.

42. The Civil Engineer proposes on his approaching visit to Canara to turn his attention to this subject. The works which he will plan are likely to be on a large scale, but while these are in progress there are numerous smaller works required at each of our ports in order to facilitate the trade.

43. The anchorage fees levied on the shipping, after paying the cost of the light house and report boat, are carried to the Government credit.* It appears to me that they ought most certainly to be applied to the improvement of the ports and my suggestion under this head is, that they be considered a fund from which I may be authorized to make disbursements for the improvement of our ports and accommodation of our shipping as above stated.

* Being about Rupees 2,700 per annum.

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## LIGHT HOUSES.

44. A light is exhibited at Mangalore, and the column for one has just been erected at Coompta. These are visible for about 15 miles. I have

marked on the Map* the circle to which their influence extends. To the small coasting craft these are of great value and I think that a light at Cundapoor is much needed.

* No 5.

## THE MEANS OF INSTRUCTION IN THE ARTS AND ENGINEERING.

45. Under this head I will at present only beg to offer the following suggestions:

46. The Government have appointed to this District two Ordnance Artificers. I propose to employ under each of them two or three youths as Carpenters, and the same number as Blacksmiths, paying them from five to eight Rupees a month. They will be a kind of Apprentices.

47. Under the Civil Engineer and under each Executive Officer several pupils might be advantageously placed.

48. Much more than this is required; for this District should be made self-dependent, but until the Civil Engineer's charge is limited to this District alone I do not think that we have the means of carrying out any systematic course of instruction.

I have the honor, &c.,

(Signed) F. N. MALTBY,

*Collector.*

## LETTER FROM H. FORBES, ESQ., COLLECTOR OF TANJORE, TO THE CHIEF SECRETARY TO GOVERNMENT, FORT SAINT GEORGE, DATED VELLUM, 9TH NOVEMBER 1855.

SIR,

Para. 1. I have had the honor to receive an Extract from the Minutes of Consultation, dated the 28th of September, No. 413, requiring my opinion on certain projects proposed by the Chief Engineer and other Officers, as far as they may affect this District, and calling for any suggestions for the general improvement of the Province.

2. The Committee commence their report by recapitulating what they conceive to be the extraordinary anomalies of the Department of Public Works, under which the Collectors are called upon to withdraw their attention from "realizing the demands of Government," which the Committee consider to be "their primary function," and to become the Executives of the State, and the Civil Members of the Board of Revenue, "without leisure for nine-tenths," of the duty, admitting them even "to possess the knowledge" requisite for its performance, are the responsible advisers of Government, the actual operations of the Board being performed by their professional Secretary, further on however the Committee modify this opinion by admitting that the Board "collectively deliberates" on the measures that may be before them, and that the Chief Engineer, as a Member of the Board, has the power, not only of influencing its decisions, but also of attracting the attention of Government to his views, by recording a separate minute.

Para 5.

Para 9.

Para 12.

3. I entirely differ from the opinion of the Committee that the primary duty of a Collector is the realization of the Government demand; the settlement of what that demand shall be I consider a far more important duty, and one which, if properly performed, will leave no room for difficulties to arise in its collection. Collectors feel acutely enough that they have now too much to do; and with less of detail duty on their hands, they would gladly give more time than is now possible to the consideration of matters, which may affect the general welfare of their Districts. On this ground I should be very glad to be relieved from the Executive duties of the Maramut, but the relief, to be of any avail, must include, not only the Collector, but the whole of the Revenue Establishment. I do not know what arrangements may be in contemplation for

the future conduct of the Maramut Executive; but I am quite sure that Collectors will not only experience no relief, but will have their difficulties vastly increased, if the mere direction of the Executive be taken from them, and their establishment be left to perform the same duties as at present, only under a different chief. It is sometimes difficult enough to perform the public service, when the Tahsildar is wanted at one place for the Revenue settlement, at another for the discovery of a crime, and at a third for the supply of a great public work, but as long as one and the same officer is at the head of all the three Departments, of Revenue, Police, and Maramut, he can make his own arrangements so as to avoid all clash of authority, and all interruption to duty; but if the heads of the Department be separate, while the subordinates are one and the same, it is easy to foresee that difficulties must constantly arise. The solution of these difficulties will all fall on the Collector; he, it is presumed, will still be the chief authority in the District, his orders and behests will probably be the first attended to, and any separate head of the Maramut Executive will complain, and not without reason, that his works are at a stand, because the Tahsildars, and subordinate servants, are all constantly engaged under the orders of the Collector and Magistrate.

4. I have served in a District with the most able and enthusiastic Engineers, and I know well enough how intolerant they are of any thing that comes in the way of an entire devotion of all the resources of a province, and of the whole time of its public servants, to the work they are immediately engaged on. It is possible to supply these demands, and still to carry on all other public service, if one officer has the direction of all Departments, but if the annual settlement, and the construction of an anicut, are proceeding in the same Talook, and the Collector and Civil Engineer have both authority to call on the Tahsildar, his Peishcars, and his Curnums, to attend to either duty, any difficulties which may be now complained of, will I think be immeasurably increased. The Collector's Establishment cannot obey two masters; and if that establishment is still to be employed in the Maramut, the Collector should remain at its head.

5. The Committee appear to be of opinion that every thing connected with the Public Works Department is purely for professional consideration; the Civil Members of the Board are doubtingly admitted to possess the knowledge necessary to advise the Government, and their professional* Secretary and the Chief Engineer,† are considered to constitute the whole efficient Board. To this view I would also take leave to demur. I do not admit that the professional question is all that has to be deliberated on and decided, in the matter of Public Works. If a bridge is to be built, or an anicut

Para 12.

*Para 9.

†Para 12.

constructed, the professional officers are no doubt alone capable of giving a plan for the one, or a section for the other; but it is obvious that this is not all that is required, and that other considerations, upon which their experience makes the Revenue Officers of Government the best able to decide, must be taken into account before the bridge is placed where it will be more useful to the community, or the anicut where most remunerative to the State. But besides this, I am strongly of opinion that to elucidate truth, great questions should be looked upon from different points of view, that different minds should be brought to bear upon them in discussion, and that a practical and useful Board of works will not be formed, if its Members be all drawn from any one class of public servants.

Para. 14. 6. Of the three distinct classes of roads described by the Committee in this paragraph, the communications in Tanjore come generally under the second class—made roads, with tunnels and bridges complete, but without any surface coating of metal. There are but two soils available in the delta of Tanjore,—black mud and river sand; being mixed together, however, they form very fair communications—should the water communications of the Province be improved so as to be generally available the greater part of the year, and be opened north and south, as well as east and west, it may be very possible vastly to improve the roads, by carrying to all parts of the District, the red gravel which is so abundant at and about Tanjore Town. The evils arising from encroachments on the road to which the Committee advert, are not possible in Tanjore, where the roads are high causeways running through the irrigated lands.

Para. 21. 7. The Committee consider very questionable the advantage of trunk road No. 9 a branch from No. 8, leading from Vikravandy to Combaconum; they remark that with the bridge across the Coleroon, it will cost $2\frac{3}{4}$ lacs of Rupees, and that it is a work of doubtful expediency, inasmuch as it runs nearly due north, and south, while the direction of trade is eastward. As regards the bridge across the Coleroon, which is to cost Rupees 80,000 out of the total cost of this line of communication, it must be remembered that the Civil Engineer had recorded his opinion, that whether it was made available for traffic or not, a foot bridge was absolutely necessary for the purpose of working the sluices in the body of the lower anicut, and it was expressly on the ground that a large sum must certainly be expended for this purpose, that the Government acquiesced in the proposition a little to enlarge the sum, and afford to traffic the ready means of at all times crossing the river. As a foot bridge therefore was at all events to be built, I do not coincide in the Committee's opinion that a bridge adapted to general traffic was a work

of doubtful expediency. Goods intended for direct export, or for transmission to the Presidency by sea, will doubtless be sent to the coast, and obtain no advantage from the road No. 9, but I think that we may too much circumscribe the public convenience, if we suppose that no communications are wanted but such as lead directly to the coast, such lines are probably the first that should be made, but I do not think they are the only ones; the sea is not the only high way, in intercommunication between even Maritime Districts, and this year, when a great quantity of grain has been supplied to Tanjore from Madura, it has all come by land.

8. The system advocated by the Committee of gradually forming a net work of internal communications by the annual expenditure of twenty Rupees per mile, in making roads between all cusbah towns, is one that does not appear adapted very speedily to effect its object. The average cost of earth work for a mile of road in Tanjore is Rupees 400, so that supposing the two towns to be united, were only sixteen miles apart, it would require twenty years on the Committee's system to perform the earth work only, and on a moderate estimate of three channels in the mile, requiring each a tunnel costing 80 Rupees, and taking no account of bridges, a further period of nearly thirteen years would pass before the communication was of any practical use. I should be much disappointed if I thought that one rate of progress was to be sixteen miles of road in 33 years.

Para 25.

9. In the 27th paragraph of their report the Committee enter on the railway question, but neither in that paragraph, nor I believe in any other, is any opinion given on one of the most interesting questions of the day as regards India, the question namely, whether perfect and high speed roads, or those of a lower speed and of ordinary construction, are at present the want of the country. In the 29th paragraph indeed the Committee state that they are far from "entertaining an opinion, elsewhere mooted, that medium speed railways are too expensive an instrument for India, and of a refinement out of keeping with the general features of the country," but from this no opinion can be gathered on the point to which I have referred. Whether there shall be railways or not, is not now to be discussed, that point is fortunately settled, but it may be still an open question of what kind the roads shall be, the views of the late Chief Engineer on this subject have, I think, gained very general acceptance, and practical men are agreed, that it is better for the country, to construct in ten years 1,000 miles of railroad for a speed of ten miles an hour, than 100 miles for a speed of thirty miles an hour. When the survey which has now been completed between Negapatam and Trichinopoly was ordered, it was generally supposed that it was intended to make the experiment of a cheap and

Para 27 & 29.

low speed railroad, a perfect and high speed line being already under construction at Madras, but as the estimate, without the addition of the price of the land, is twenty-seven thousand Rupees a mile, the project will probably be abandoned, as the line is not one that will pay the interest on thirty lacs of Rupees.

10. I could strongly advocate a less expensive work; either a low speed railway, or, what has frequently occurred to me as admirably adapted to Tanjore, a tramway of granite stone, laid on a masonry foundation—the cost of such a work would probably be about 4,000 Rupees a mile, and it could be constructed on the present road from Trichinopoly to the coast for the sum of four lacs of Rupees.

11. In paragraph 59 the Committee take up the subject of a coast canal from the north of Rajahmundry to Negapatam in Tanjore, a work which it is supposed can be performed for about 112 lacs of Rupees. I am not insensible of the advantage which Tanjore would derive from cheap water communication with Madras; and I earnestly desire that the projected work may be completed. It will not however be without its difficulties, among the chief of which will perhaps be found one that has been experienced here in the canal at Tranquebar, where the light sandy soil of the coast is so little able to resist the force of the high and continued westerly winds which prevail in the hot weather, that the bed of the canal was this season almost wholly silted up, and was quite useless for navigation, thick plantations on the outside of either bank of the canal may obviate this evil, and if so, they should be formed paripassu with the excavation.

12. But the subject which most intimately and immediately concerns Tanjore in the report, is that referred to in the 70th paragraph; namely, the formation of reservoirs of water in the upper country, from which to supply the rivers, at times when they would otherwise be empty. On the practicability of the measure I am incompetent to give an opinion, the Agunda-cauvery is a very large river, and its sandy bed would absorb much water in its passage between the Hills and Tanjore; the projector of the scheme, however, has earned so lofty a reputation, and is so confident of the success of the plan, that it cannot be lightly set aside. The Committee are under the impression that the supply of water to Tanjore is "at present too precarious," and that "there is a great tract of land under the command of the rivers still uncultivated." The term "precarious" is I think, hardly applicable to the irrigation of Tanjore, there was a failure of water only last year it is true, but it is also true that such a season had not been known for more than thirty years; the chief ground for introducing the Woloongoo renting system was, that the irrigation of the Province was *certain*, and it is surely this certainty that gives

to the land its great value in the market: indeed, the Committee in a subsequent paragraph (74.) themselves admit that, "the periodical freshes in the larger streams rarely fail," and offer their opinion that the main principle to be followed in "improving and extending irrigation," is the "diversion," not, the increased supply of water. Of late years the remission granted for short produce has not averaged more than half a lac of Rupees, and has been given mainly on lands, on a high level, or most remote from the source of irrigation, and receiving water only during the high freshes—the proposed reservoirs are not intended to fill the rivers, but to afford only moderate supplies of water, the lands referred to therefore would not derive any benefit from them. If the plan of forming reservoirs be practicable, their use will probably be found in affording to the rivers a stream during the summer months, by means of which the people may be induced to enlarge their second crop, and water communication be kept up throughout the whole year. The question of the practicability of these reservoirs is purely a professional one; and even the Committee, formed almost wholly of professional officers, does not appear to have come to any decided opinion, for while in paragraph 73 they say that, "such reservoirs are *indispensable* parts of a general system of improvement"—in paragraph 49 they say that, they "feel themselves *unable* from want of information, to offer *an opinion* upon the plan."

13. I do not know to what land the Committee refer, when they mention "a large tract under the command of the rivers still uncultivated;" it must of course be some land that is uncultivated only because it cannot be irrigated for want of water, or the remark in its present place would have no particular bearing on the question under discussion. There is a very large tract of land in Puttoocottah that could be irrigated and is not, but the cause of its remaining waste is not a want of water, which the Civil Engineer has offered to supply, but its being all maniem land, the owners of which have declined* to pay any water cess; there is also a large tract of waste land in Tritrapoondy, but it has remained waste, not for want of water, but from an over-abundant supply—it has been a swamp for ages, and a plan for draining it has lately been submitted for sanction.

* Collector to Board of Revenue D. P. W., 29th of April 1854.

14. A variety of circumstances have combined to place Tanjore considerably in advance of other Districts as regards its public works; it has about 1,000 miles of made road, all bridged and tunnelled, its works of irrigation and drainage are almost innumerable, and the liberality of Government has this year been shewn in the sanction given to two large bridges across the Coleroon, at Combaconum, and Anakaren Choultry, so as to afford to traffic those facilities for entering and leaving the District, which it has long enjoyed

within the Province itself. That considerable care and attention has hitherto been bestowed upon the District, is however only a strong argument why the same system should be continued; the results of what has been done afford the best forcible encouragement to a pursuance of the same policy, and I shall therefore now state what are still the wants of the country.

15. The roads of the District, although now kept in very good repair, and generally speaking, as good as we can make with mud and sand, the only available materials, are no doubt at times very heavy to work on; if the mud predominate, so as to afford a hard surface in dry weather, when heavy rain falls the road is almost impassable; and if, to prevent this evil, sand be liberally supplied, the draught is certainly heavy when there is a long cessation of rain; the cattle of the country too are at best but poor creatures, as must necessarily be the case in a District where there is no pasture. Along the main and central line, or from Trichinopoly to Negapatam, some better communication therefore is certainly highly desirable, and a low speed railway, or a granite tramway, present themselves for choice; the latter would cost about 4,000 Rupees a mile, and yield no direct return,—the heavy traffic of the country would pass along it, but is not probable that public conveyances would offer facilities to passengers. A low speed railway, although costing more in construction, and something in daily working, would still yield its return; all goods passing to the coast would certainly be sent by it, nor is it probable that the people would long prefer to walk, when cheap and speedy conveyance was hourly passing along; the way in which the people appear to have flocked to the rail in Bombay and Bengal, is a sufficient answer to any doubts that may ever have been felt, as to how far a means of conveyance, open equally to all classes, was suited to Hindu Society.

16. The traffic along the road in question was taken for twelve months for Major Pears, and the following is the result.

*Traffic on the road between Tanjore and Negapatam, as taken at Adeyakamungalum, from August* 1853 *to September* 1854.

| | | | |
|---|---|---|---|
| Carts ... ... ... | 80,770 | Foot Passengers ... ... | 5,35,251 |
| Bullocks ... ... | 1,13,712 | Bullock Carriages. ... | 1,107 |
| Horses .. ... ... | 1,490 | Palanquins ... ... | 261 |
| Asses ... ... ... | 10,978 | Sheep ... ... ... | 2,775 |

17. I have seen in a public print, that the returns from the railway at Calcutta, open for about forty miles, have been rather more than 4,000 Rupees a week, and this has led me to doubt if a high speed railway, as lately

surveyed and estimated for by Lieutenant Tyrrell, would be likely to answer here. The total cost being taken at 30 lacs of Rupees, to give a return of five per cent. the annual collections must be one and a half lac, or about 3,125 Rupees a week; this is not very much below the collection from the Calcutta rail, which has the immense advantage of having a capital for its terminus, while, as besides the five per cent. interest, the Tanjore railway, to be a paying line, must also provide its own working expences, there seems reason to doubt whether, in a pecuniary point of view, the speculation would be likely to answer. As at present informed, therefore, I should be induced to recommend for Tanjore, a cheaply constructed and low speed railroad.

18. If the project of storing water in the upper country to supply the rivers in the dry months, be practicable, water carriage may be made available in Tanjore throughout the year; but the traffic passing west and east will alone have the benefit, unless some cross works connecting the main rivers should be projected and performed. A canal cut from the Vennaar at Tanjore in a northerly direction, would connect that river with the Vettaar, the Codamoorty and the Cauvery, and open water communication from Tanjore and its neighbourhood, to the whole country through which those rivers pass; similar canals from Munnargoody to Combaconum, and from Tritrapoondy to Myaverum, would intersect more rivers than it would be convenient to mention here, and would afford to the people of all parts of Tanjore cheap and easy means of proceeding, or conveying their goods, to any other part. The means which would thus be afforded of conveying the gravel of the higher lands to all the roads in the delta, is a point which should not be forgotten.

Vide the accompanying sketch

19. It occurs to me to recommend only one other description of work as calculated to promote the comfort of the people and the prosperity of this Province, and it is one which I have already brought to the notice of the Board of Revenue. Tolerably well supplied as Tanjore is with main lines of road, there is a great want of minor works to connect them with the villages, a vast proportion of which are situated in the midst of paddy fields, and have no means of reaching the roads except along the tops of the paddy banks, the use of carts therefore is out of the question, and thus is probably accounted for, the fact which will have attracted attention above,* that while the annual traffic along the high Tanjore road included only 80,700 carts, there passed in the same time as many as 1,13,700 bullocks; the road is as good as any in the District, but the people have no means of reaching it from their villages except by the use of bullocks.

*Para 16.

I have the honor, &c.,

(Signed) H. FORBES,

TANJORE, *9th November* 1854. *Collector.*

## LETTER FROM R. D. PARKER, ESQ., COLLECTOR OF MADURA, TO SIR H. C MONTGOMERY, BART., CHIEF SECRETARY TO GOVERNMENT, FORT SAINT GEORGE, DATED 8TH DECEMBER 1854. No. 1209.

SIR,

1. Since the receipt of the Extract from the Minutes of Consultation, dated 28th September last, I have been in constant communication with the Civil Engineer regarding works for the improvement of the Madura District, but I have hitherto overlooked the circumstance of any direct report being required from myself.

2. I do not perceive that the District is susceptible of any large irrigation work in addition to those now existing. The Vigay formed by a union of the several streams which drain the Pulney range of mountains to the eastward, is the only considerable river; and this, though wide, is extremely shallow. With the anicuts now upon it, of which the only ones of importance are the Pereanay and Chittanay in the cusbah Talook of Maudacolum; not only does very little water reach the sea, but even the Ramnad tank into which the river flows direct rarely receives a supply. Considering that the Peshcush of the Shevagungah and Ramnad Zemindaries was fixed on assets derived in a considrable degree from the irrigation of this river, and that there is much oftener a deficiency than an excess of water in it, I doubt the justice of diverting from it a larger supply to the Government Talooks by fresh works; and I also very much doubt the practicability of converting any of its channels into navigable canals.

3. In the early part of the Company's rule endeavors were made to turn mountain streams now flowing westward into Travancore into streams communicating with the Vigay; but no success was then achieved; and from conversations which I have had with Captain Horsley on the subject, I should suppose him not at all sanguine of advantage from future attempts. If additional water could be thus obtained, a larger extent of the District could no doubt be irrigated. The Ryots if not rich, are well off, and always ready to avail themselves of any means presented for converting their dry land into wet.

4. I am inclined to think it desirable to revet some of the chief tanks

of the District with rough stone. The bunds formed purely of earth are not adapted to withstand great rushes of water, such as occur every 5 or 6 years; and it is to be borne in mind that such floods happen generally of a sudden after long droughts, when the earth banks are rendered more than usually weak by large cracks.

5. There is very little depth of water in general along the Madura coast; and slight temptation therefore to expend money in the hope of creating a considerable port. One place is an exception. Autenkaray where the steamer calls for treasure. Here such part of the Vigay river as surpluses from the Ramnad tank disembogues; but on inspection of the Map it will be seen to be disadvantageously placed at some distance along the spit of land running out towards the Island of Ramisweram, and to be reached therefore only by a long land journey. The road to it is in general not good, and the latter part of it scarcely capable of being made so, as it lies through deep sand. I have requested the opinion of Captain Franklin, the Secretary to the Marine Board, who has I believe, surveyed the coast, as to its capabilities.

6. The object to which expenditure can in my opinion be most profitably applied in the Madura District is its roads. Some years ago these were considered superior to those possessed by most of the other Districts of the Presidency—and perhaps even now no tract in India of equal extent presents a greater number of *lines* of road which are traversed by bullock bandies than Madura. But in equality they can bear no comparison with the new roads made in other parts of the country. They are composed chiefly of the natural soil. Only here and there has any gravel been spread, and I know of no part which can be termed metalled except about 10 miles between Pulney and Chuttraputty on the road which connects Dindigul and Coimbatore.

7. It seems to me that the following roads deserve to be made in a superior style.

No. 4.—Connecting Madura with Trichinopoly and Palamcottah.

No. 2.—Between Darapoorum in Coimbatore and Dindigul.

No. 15.—Between Dindigul and Madura.

No. 16. Between Madura and Aroopoocottah.

8. Others particularly Nos. 1, 13, 17, 18, 20, 25 and No. 16 between Teroochooly and Coast require to be in good repair.

9. The importance of No. 4 as a Military road is admitted; but its value in a commercial point of view is I think much underrated. I observe more traffic on it than on any other road in the District. I never ride along

it in the morning without meeting a long line of bandies, and in the evening, the Pettahs or walled enclosures, which in Madura are very numerous, are full of them.

10. By No. 15 is conveyed the cotton of Coimbatore and Dindigul which seeks Tuticoreen in the Tinnevelly District as a port of export, and other produce of the west which finds a market eastward.

11. Both the above roads not only stand in need of gravel and occasionally metal* to place them in a proper state, but also of a bridge across the Vigay which intersects them both near Madura. This river for some days during the last month was impassable and often presents a considerable obstacle to laden bandies. If Military aid had been recently required from Trichinopoly in the country to the southward, it could not have been afforded. I would therefore propose to build a bridge across the Vigay at Madura on road No. 4, and to connect it by a cross road with No. 15, which reaches the river six miles higher up the stream. The expense of the bridge may be roughly estimated at Rupees 60,000.

12. The Madras road No. 4 will then be entirely bridged throughout the Madura limits, but No. 15 between Madura and Ramnad is again twice crossed by the Vigay, and if this part of the road be raised into importance by the construction of a port at Autenkaray, two more bridges will be required at Mana Madura and Purmagoody.

13. No. 2 is in fact a continuation of No. 15 to the Coimbatore frontier and therefore equally important. Traffic along it is now impeded by want of bridges over the Amravutty which divides Madura from Coimbatore and the Shunmoogum near the town of Pulney. I have written to the Collector of Coimbatore to propose that he shall undertake the first, and the Civil Engineer of the 8th Division will submit for sanction an estimate for the second.

14. No. 16 between Madura and Aroopoocottah is rendered of importance because a first rate road having been made between the latter place and Tuticoreen it seems desirable to continue it to Madura.† At present it runs from Madura by Teroochooly to the southern Salt pans. It may be expected, that the Salt trade would be increased by a portion being placed in a superior and the rest in a good state of repair.

15. When the railroad is constructed from Palghaut to Negapatam, branch roads will be required to connect it with this District, but not being

* By metal I mean a substratum of broken stone.

† For the conveyance of the West Country Cotton.

aware of the exact line it will take, I cannot say where. The Assistant Civil Engineer is at present occupied in making an estimate for placing road No. 1 which connects Dindigul with Trichinopoly in a proper state of repair.

16. In order to the performance of any considerable work in this District, it is, I feel assured, absolutely necessary, that a proposition made by the Civil Engineer for raising a Corps of labourers should be sanctioned. Every work in which we are engaged is retarded by the scarcity of labor caused not by any circumstance to be deplored, but on the contrary by the well being of the people who can all find employment, more to their taste, in agriculture, and are becoming too well aware of their rights to answer the summons of the Tahsildar to execute maramut. We have extreme difficulty in persuading them to perform repairs to tanks in which they perceive their direct interest; it may be imagined therefore that road works will not attract them though by exertion they can earn more this way than in their Villages.

I have the honor, &c.,

(Signed) R. D. PARKER,

*Collector.*

COLLECTOR'S OFFICE,
MADURA:
*8th December* 1854.

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M56

## LETTER FROM CAPTAIN A. BOILEAU, CIVIL ENGINEER 2D DIVISION, TO SIR H. C. MONTGOMERY, BART., CHIEF SECRETARY TO GOVERNMENT, FORT SAINT GEORGE, DATED 16TH NOVEMBER 1854.

SIR,

Adverting to an Extract from the Minutes of Consultation No. 413, dated 28th September, forwarding No. V. Selections from the Records of the Madras Government, I have the honor to subjoin the following observations on the projects therein set forth as regards the Division of which I have the charge, and to lay before Government generally my views (so far as my limited experience therein enables me) for its improvement.

The subject seems to divide itself thus :

1. Communications.
2. Irrigation.
3. Ports.
4. Superintendence.

2. The Government are fully aware that up to the commencement of the present year little had been effected for this Division under the first of the above Headings further than in the formation of the great north road No. 6 running through the whole length of the Nellore District. A different state of things however has now sprung up. Three new lines of road are in active progress, viz., the northern or Cummum line including the Nundy Canama Ghât reaching to the Sea Coast, the central or Budwail line from Cuddapah to Nellore, including the Dorenall pass and extending to the coast at Kistnapatam, and the Chitwail or southern line including the Raupoor Ghât and having for the present its terminus at Goodoor, up to which the Rampairoo navigable backwater at Kistnapatam will be eventually extended.

3. In addition to these, the old Cuddapah and Bellary frontier line is being converted into a very good 2d class road, and a small amount has been expended in improving the direct Cuddapah and Madras road (Trunk No. 13.) Moreover, sanction has been accorded to the extension of the Budwail line to Podatoor, which a want of Overseers has prevented me from commencing up to the present date. This want however has now been supplied. There are besides under the Superintendent of roads two important lines of communication in progress in the Cuddapah District, viz., Trunk No. 11, joining Arcot with Cuddapah and the branch from Mahal towards Bellary forming Trunk No. 12. That is the state of the roads actually in progress

in the present year; these remarks have been made adverting to paras 23, 41 and 42 of the 'Collective Memorandum, &c.'

Extract Minutes Consultation, No. 48, 27th Jan. 1854.

4. The additional lines proposed to be taken up next year or in 1856 in this Division are chiefly those pointed out by Government themselves as most likely to be of avail in opening out the Districts and rendering the coast easily accessible from all points of Cuddapah and Nellore. They are enumerated in the subjoined list, which also includes various lines suggested by the Collector of Cuddapah with reference to the remarks made regarding the absence of communications in the southern and western Talooks of his District in the 42d paragraph of the pamphlet under consideration.

*List of Roads proposed to be commenced in the years* 1855 *and* 1856.

| District. | Line of Roads. | Remarks. |
|---|---|---|
| Nellore .............. | Goodoor to Doogoorajapatam by Cusbah Cottah .............................. | Feeder to Canal. |
| Do. .............. | Naidoopett to ditto ...... | Do. |
| Do. .............. | Calastry to Sooloorpett ................ | Do. |
| Do. .............. | Nellore to Gungapatam................ | Chiefly for the conveyance of Salt. |
| Do. .............. | Nellore to Todairoo... ......... ......... | A connecting of Cusbahs to be eventually extended to Raupoor. |
| Nellore, Cuddapah and Guntoor ...... | Doopaud, Adunky, Chendalore and Chinna Ganjam ...................... | Opening up Coast to interior. |
| Nellore & Cuddapah | Giddalore, Kunnigherry, Patchoova, Davagoodoor and Paukalah ......... | Do. do. |
| Do. do ... | Poremaumala by Takoor Ghât to Ramapatam ...... ......... ........... | Do. do. |
| Cuddapah ............ | Extension of Budwail and Poddatoor line to Bellary frontier N. of Pennair | Do. do. |
| Do. ............ | Cazepett to Kurnool frontier............ | Establishing the communication northward to Kurnool and Hyderabad. |
| Cuddapah & Guntoor | Cummum to Doopaud and Vureekonda | Connecting Cuddapah District and Guntoor, see para 16, Ex. Min. Con., No. 48, 27th Jan. 1854. |
| Cuddapah ............ | Roichottee to Chitwail ...... ............ | Opening the heart of Cuddapah District to the Coast by Raupoor Ghât. |
| Do. ............ | Cuddapah & Madras Road (Trunk No. 13) | The most direct road to Madras |
| Do. ............ | Cuddapah to Vaimpully.................. | Establishing communications in the southern and western Talooks of Cuddapah as recommended by the Committee in the Collective Memorandum. |
| Do. ............ | Poolevaindla to Vaimpully ............ | |
| Do. ............ | Cuddree to Vaimpully .................. | |
| Do. ............ | Roichottee to Vaimpully ............... | |
| Do. ............ | Cuddree to Poolevaindla.................. | |
| Do. ............ | Roichottee to Goorumconda ............ | |
| Do. ............ | Muddenpully to Goorumconda ......... | |
| Do. ............ | Muddenpully to Poonganoor............ | |
| Arcot & Cuddapah... | Palmanair to Poonganoor ...... ......... | |
| Cuddapah & Nellore | Direct road from Cuddapah to Nellore on S. side of River.................... | See paragraph 6th, of this letter. |
| Cuddapah ............ | Budwail to Poremaumala ............... | A useful adjunct. |
| Do. | Completion of Cuddapah and Cummum | |

5. On the completion of these lines, with the connection of Cusbah towns as proposed by Government in para 15, Extract Minutes of Consultation, No. 48, 27th January 1854, there will be little left to be desired in the matter of affording the means of developing the resources of this extensive Division.

6. Amidst the many useful lines of road proposed in the above Tabular statement there is one to which I wish to call special attention and that is the direct road from Cuddapah to Nellore on the south side of the river Pennair. I could have wished to have delayed the forwarding of this Report until I had had an opportunity of examining it in accordance with the order of the Government and the Board, but there is something so evidently feasible about it (for the hills immediately to the south of the Pennair cannot offer difficulties for road making superior to those already in process of being overcome in the Nundy Canama and Raupoor Ghâts) and so clearly advantageous for adopting the first 15 miles of the direct Cuddapah and Madras road as far as Ontimitta, leaves only 70 miles to be constructed, making a total distance of 85 miles in lieu of 103 by the present road, to say nothing of crossing only one river (the Cheyaur) in lieu of the Pennair twice, the Suggleairoo, the Katamanairoo, the Boogairoo, and the Beerapairoo. Of the importance of this direct communication I believe it unnecessary for me to speak.

7. As the several lines of road suggested must be deficient in utility until substantial bridges are constructed over them, I have proposed by way of a commencement to undertake such works across the Mooshee on the northern line, the Boogairoo and Suggleairoo on the central and the Kundlairoo on the southern line, and I hope we shall gradually progress until bridges of a permanent character span all important streams.

8. While on the subject of communications I have said nothing of the Eastern Coast Canal which will traverse the whole length of this Division in the Nellore District ; it is obvious however, that many of the lines of road above enumerated will form feeders to the grand Canal which will carry the available produce of the whole of Nellore and parts of Cuddapah and Kurnool to the Madras market, while many other lines in the list will act as feeders to the Madras and Bellary Railway.

9. With regard to the irrigation of this Division, the Committee most justly observe, that "great advantage may be obtained from the river Pennair," and again in Cuddapah and Nellore the benefits of the Pennair may be largely applied. The Ellagonda range of hills dividing the two Districts throws nearly the whole of the drainage of the Cuddapah District by this river through a sin-

gle outlet into the plains of Nellore. Thus the Districts seem formed, the one for the support of the other. With the exception of the rivers which have their sources in the Western Ghâts there are none to be compared to the Pennair in importance, and none I believe which can be made to irrigate a greater surface of the plain country.

10. The anicut now under construction across this river at Nellore is so near to the coast that it will be impracticable to extend its influence much beyond the lands fed by existing channels, though something may be done by cutting channels north and south maintaining a high level; by this means a portion of the Nellore tank lands may be irrigated at a time when water would fail in the tank, but my first object in regard to this anicut is by perfecting existing channels and tanks to afford the people the means of cultivating all their lands, and so to restore the fallen revenues.

11. My hopes however for the improvement of the eastern portion of the Division, that is, the Nellore District, rest in taking advantage of this river, shortly after it has disembogued from the hills, probably in a line with the 2d or lower range of hills at Varegoontapaud and Penna Budwail, there heading up its waters by means of an anicut and diverting the river through large irrigating channels as far as they can be conveyed with a moderate slope, north east, and south east.

12. Feeders could be thrown off for the several important existing channels and tanks on the north and on the south, while the main channels would be carried on for the irrigation of waste and for the conversion of many lands hitherto cultivated with dry grain crops. There are numerous vallies in the Cuddapah District throwing their drainage into the Pennair which appear peculiarly adapted for the formation of Reservoirs by damming up their gorges and by this means no doubt cultivation could be carried on for a much longer time than usual.

13. This then is a definite project which I hope to have time to work out by and by, but though only 10 miles from its locality while I write, I can merely hope to get a glance of it as I pass whither other more immediate duties in the south and in the north of the Cuddapah District demand my instant presence.

14. When this has been duly attended to it will be my endeavour to devise some means whereby some of the millions of cubic yards of water that now run waste into the Sea by the Gundlycunama, the Mooshee, the Pallair and the Munair may be diverted for irrigation or reserved for use as required. No doubt hundreds of small reservoirs might be made by judiciously

connecting some of the numerous hillocks which dot the plains of Nellore and so intercepting the water which now runs waste between them.

15. My personal acquaintance with the Cuddapah District is at present so limited as not to enable me to devise much that is original for its improvement. I have a Surveyor now employed in considering plans for the better supply of the town of Cuddapah and of that portion of the country which is bounded by the Pennair on the north, the Paupugnee on the west and the hill range on the east and south. My idea is that peculiar facilities appear to exist for retaining the drainage water and regulating its discharge. It now comes down chiefly by the Ralla and Boga rivers in a rush lasting perhaps a few days. Reserved and under management it may be turned to advantage both for the irrigation of the country, and to remedy an evil, the want of water for domestic purposes, which I believe is at times severely felt, in the populous town of Cuddapah.

16. For the rest Captain Lawford's Report of 1840 on the 3d Division (which then comprised the District of Cuddapah,) together with the hints thrown out in para 83 of the Committee's Collective Memorandum, will I believe, afford me an ample basis of operations in that District for a long period to come, for it is precisely the District of all others that I know the best suited for the "formation of new tanks in the uplands for the support of distant irrigation."

17. I entered a heading Ports at the commencement of this Report merely to afford myself an opportunity of bringing forward one of the only inlets that I have ever seen in this country, which, with some expenditure may I believe be made to afford not only a place of refuge for ships of moderate tonnage, but from its position near Nellore, and from the communications which are now being established with the interior, might be made a harbour of export. I allude to the backwater at Kistnapatam, only 17 miles from Nellore. At high tide 7 feet may be had over the bar, and within the bar are from 15 feet to 20 feet of water, boats drawing 9 feet may navigate 10 miles and those drawing 6 feet, 8 miles further. An estimate is now before Government for extending the backwater to Goodoor, and I hope before that is completed that I shall be able to give my attention and lay before the Government, through the Board my plans for a harbour at Kistnapatam, I have not yet had an opportunity of forming any judgment as to whether other places on the coast where small vessels now touch could be improved at a moderate cost, but the subject will engage my attention.

18. I before quoted the first clause of the 3d sentence in para 77 of the 'Collective Memorandum,' and now gladly embrace the opportunity of say-

ing a few words regarding the last clause, "but no definite projects have ever been brought forward owing to the want of Officers in the Civil Engineer's Department."

19. When it is borne in mind that this Division embraces an area of upwards of 20,000 square miles of country, and that for the whole of this extensive range there is but one Civil Engineer, one Assistant Civil Engineer and 2 Surveyors, the Assistant having abundant occupation for months to come in completing the Pennair anicut, and estimating for and carrying out the improvement of the channels and tanks under it, while the Surveyors are chiefly emyloyed in what may be termed ordinary tank duties, examinations of works and so on, it will appear how great is the task imposed upon the Head of the Department and, I will add, how impossible for him to perform more than a fraction of his duties. In this year 1854, this spring-time of Public Works, there are Ghâts to be traced, and roads to be estimated for in every corner of the Division, there are sections of rivers to be taken for the construction of bridges in the north, in the south, in the east and in the west, there are Overseers awaiting the presence of the Civil Engineer to be instructed in their duties at one end of Cuddapah, at the same time that arrangements need to be made for recommencing the works at an important mountain pass at the other end. A single project, before alluded to, (the diverting of the waters of the Pennair on its disemboguing from the hills for perhaps 100,000 acres) would rightly engage his whole attention for months, but in the terms of the Committee I regret to say "no such definite project can yet be brought forward owing to the want of Officers in the Civil Engineer's Department."

20. I have taken no notice of Executive Officers for they are not the class I am alluding to. My remarks have reference to Officers allowed for general duty but chiefly for projecting and estimating for new and important works, and of these we require not less than four that is, one for the north, and another for the south of each District; to each Officer should be attached a Surveyor and Apprentices; or, there should be a Civil Engineer with an Assistant in each District, at least in such Districts as Cuddapah and Nellore. There would be some hope then of his being able to fulfil his duties to the entire satisfaction of Government and to his own credit, but with the present limited establishment of Officers, an establishment formed I believe, under a different order of things from that existing in 1854, it is impracticable. I can assure the present Government that His Excellency the late Governor of Madras most justly estimated our duties when he called them 'unceasingly laborious and responsible.' It is not my desire to reduce the amount of that labour or to shrink from that responsibility, but to be enabled

to apply the former most advantageously, and to undertake only so much of the latter as I can creditably engage myself to act up to.

21. Not less inadequate to the increase of duties lately introduced is the Civil Engineer's Office establishment. While out of door work is vastly multiplied, indoor duties have equally progressed. Correspondence compared with former years is tripled; and that which before made no part of a Civil Engineer's duties, viz., the keeping of accounts, (with money responsibilities) now forms a very essential part of them. 'Engineers are not necessarily Accountants,' or to that effect wrote the Most Noble the present Governor General in Council in his Minute on the Bengal Public Works Commission, and truly though the keeping of road accounts may seem to be a simple affair, but I can testify to the labour and anxiety which they bring with them, more especially where the decease of Executive Officers and Overseers has left no clue to errors which are detected too late. I feel greatly the want of a skilful Accountant and I trust that ere long such a subordinate will be attached to the Offices, at least in those Divisions where such earnest attention is now being given to opening up communications, involving large expenditure under the immediate control of the Civil Engineer.

22. Were it not that I have temporarily attached to me the office of the 1st Assistant Civil Engineer, and that I have entertained a private writer and another out of the Road Funds, the work of this Office would fall irrecoverably into arrears. To prepare plans for the numerous large bridges, &c., which are proposed for 1855 and 1856, a clever Draftsman is urgently required; my endeavours to obtain one on my private account have failed. Of Executive Maistries competent to the more difficult parts of bridge building I believe there are not more than two in the Division. It will be my earnest endeavour to train such as promise well.

23. The class of apprentices would probably be most useful practical auxiliaries in the Survey Department, but the examination which they must pass (including Algebraic equations) will I fear bar the promotion of many of them to the lowest grades of that Department.

24. I trust the Government will not consider that I have unnecessarily entered into minor details when merely 'suggestions for the improvement of the country' were called for, but believing that great results can only be expected, in this instance, from enlarged means, and that to do work fully and efficiently, a full and efficient staff of operatives is required, I have thought it right distinctly to lay before Government the utter inadequacy of our present establishment of Officers and Subordinates, to the end in view.

25. It is my intention to make a trace (from the printed maps) of the whole of this Division, showing all roads in progress and proposed and exhibiting as far as may be in plan my views for the improvement of this Division as above set forth, and which shall be forwarded to Government as soon as completed.

26. The Maps forwarded with the Collective Memorandum are incorrect in many points.

CIVIL ENGINEER'S OFFICE,
2D DIVISION,
CUDDAPAH DISTRICT,
CAMP COTTOOR,
16*th November*, 1854.

I have, &c.,
(Signed) A. BOILEAU,
*Civil Engineer 2d Division.*

## NOTICE OF WORKS REQUIRED FOR THE IMPROVEMENT OF THE DISTRICTS FORMING THE 3D ENGINEER DIVISION OF THE MADRAS PRESIDENCY, VIZ., BELLARY, CANARA, AND KURNOOL, OFFERED IN CONFORMITY WITH ORDERS OF GOVERNMENT CONTAINED IN EXTRACT MINUTES OF CONSULTATION, DATED 28TH SEPTEMBER 1854. No. 413.

1. To quote from para 2 of the "Madras Committee's Report," the object in view is to furnish a contribution towards "a comprehensive scheme of a thoroughly practical nature, embracing the development of the resources of Southern India, and material improvement of the country; whether, 1st, by opening up the communications (roads, canals, navigable rivers, or railroads, according to the localities to be traversed) or, 2dly, by increasing the value and extent of agricultural produce by irrigation projects; or, 3dly, by facilitating commercial transactions on the seaboard, by adding to the security and accommodation of ports and harbours on the Western Coast."

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### 1ST HEAD–COMMUNICATIONS.

2. *1st Sub-Division.* Roads, of any of the three classes mentioned by the Committee, but limited to main lines and their branches, leaving local roads to be treated of by the Collectors of Districts.

Main roads.

3. The main roads of the 3d Division are naturally divided into eastern and western lines; the former including all outlets for trade to the ports of the Coromandel Coast, and great portions of the Military communications between the stations of Bangalore, Hyderabad, Bellary, Kurnool and Cuddapah; the latter including roads, the traffic on which mainly seeks the Canara ports, and portions of Military communications between the stations of Bellary, Dharwar and Hurryhur, Mangalore, Mercara and Bangalore.

4. The eastern lines, till the famine of 1854, may be said to have been left entirely to nature; or if any thing had been done towards their improvement, want of the necessary repairs had obliterated all trace of the

Eastern lines of the Division.

same. As viewed by the Civil Engineer, the amount of mileage within limits of the 3d Division east of Bellary, to be brought at once into the state of the Committee's 1st class of roads, i. e., bridged, and metalled throughout is as follows, viz.

| | | |
|---|---|---|
| 1. | Bellary and Ghooty Road | 50 miles. |
| 2. | Huggry bridge to Kurnool | 84 " |
| 3. | Huggry bridge to Anantapoor and frontier of Cuddapah, (Trunk road, No. 12) | 90 " |
| 4. | Kurnool to Ghooty, Anantapoor and Mysore boundary | 160 " |
| 5. | Ghooty by Adony to Raichoor frontier on the Toombuddra, including branch from Auloor to Adony | 94 " |
| 6. | Kurnool to the Nundy Canama Ghaut | 60 " |
| 7. | Bellary to Mysore boundary at Heeryhall | 15 " |
| | Total 1st class lines | 553 miles. |

Of these No. 7 is finished, half of No. 3 in actual progress, under sanction, including a bridge over the Pennair river at Ooderpee Droog; Nos. 2, 4, 5 and 6 having been laid down with great thicknesses of metalling at enormous expense, by the famine coolies, have been recommended to the Supreme Government for completion with bridges, and for annual maintenance at Rupees 100 per mile, the Famine Establishment of Officers and Overseers being kept on till answer is received. And No. 1 is a line of such great importance and on which so much has been done by the famine coolies that the Collector of Bellary and Civil Engineer have urged its adoption into the category of the 4 preceding.

Since sanctioned.

5. It is felt that the attempt to bring the above eastern lines into an efficient state, including masonry works, is as much as can be done with any chance of making fair progress; only 50 miles therefore are desired to be added to what have already been adopted in the Government scheme.

6. Of bridges in connection with these lines those over the Huggry and Pennaur rivers require most immediate attention. On the old lines of Nos. 1, 2 and 3, the former stream is crossed at three different places within 15 miles, and in taking up the road work of the country on a systematic plan it has occurred to the Civil Engineer that

Principal bridges.

one bridge at the most central site would accommodate all three lines without adding more than 3 or 5 miles to actual distances on the two side lines, and without avoiding any places of note. A decision on other than local grounds should be given as to this proposition in time to allow of an estimate for bridging the Huggry at Permadavenhully being included in the Budget of 1856-57, and new lines of road to Auloor (on No 2,) and Ooderpee Droog (on No 3) laid out, superseding the direct routes by Mokay and Roopungoody respectively.

7. The Pennaur is crossed by three of the above main lines, viz., on No. 3 at Ooderpee Droog, where a bridge has already been sanctioned on an estimate of Rupees 35,280, on No. 4 at Paumdy, estimate for a bridge at which place should be entered in the Budget of 1856-57. No. 1, if continued to Cuddapah would cross the Pennaur lower down at Taudputtry, but for reasons to be detailed hereafter, a bridge does not appear necessary there.

8. The following eastern lines are also of first rate importance, and their commencement as regards accurate trace and opening for cart traffic in dry weather should not be delayed, as the commerce of the country will be materially affected by them.

| | | |
|---|---|---|
| No. 8. | Ghooty by Yadakee, Nittoor and Bogasamoodrum to the frontier of Jummulmudgoo Talook of Cuddapah...................................... | 35 miles. |
| No. 9. | Paipully to Mahadeopoor and the Nundy Canama Ghaut, including the portion through Banagaupilly........................................ | 65 " |
| No. 10. | Chagulmurry to Mahadeopoor and Nundy Canama Ghaut............................................. | 30 " |
| No. 11. | Bellary by Yaparaul, and Calliandroog to Mudducksera (exclusive of Pawghur in Mysore.) ...... | 75 " |
| No. 12. | Amkoondy bridge on the Heerioor and Bellary road, by Yaparaul to Pennaur bridge at Ooderpee Droog.............................................. | 45 " |
| | Total, 2nd class......... | 250 miles. |

9. The Bellary and Kurnool Districts are positively without direct communications passable by carts to enable their produce to reach the Coromandel Coast, and to facilitate the supply of salt inland. This crying evil should be at once removed by opening out Nos. 8 and 9, so as to take advantage of the works in progress in the 2nd Division whereby the Nellore Coast at Ongole and

Nellore is being made accessible from the interior by roads in connection with the Nundy Canama Ghaut and Dorenall Pass. The importance of these lines therefore cannot be exaggerated. Connecting them and in continuation of Trunk Road No. 11, from Cuddapah to Kurnool is the line No. 10, the portions of which and No. 8, within the Cuddapah District including a bridge over the Pennaur at Chennoor render it unnecessary to keep up the direct Ghooty and Cuddapah road except as a second rate local line. No. 11, is greatly required to open out the southern Talooks of Bellary, and passes through a valuable tract of country irrigated from the Huggry river and by many tanks, from which Bellary draws much of its supplies. The Huggry crossing will be managed conveniently at all times by a Ferry established in the still water above the proposed anicut at Yaparaul. No. 12, is an essential branch connecting Nos. 3, 11, and the Mysore line of which, No. 7, is a portion with one another at points where means of crossing the larger streams are or will be provided on them, and giving the south eastern portion of the Ceded Districts access to the west.

Western lines of the Division—*Bellary*.

10. The attempt to treat of the western lines of the 3rd Division connectedly has been so confusing a task even to one well conversant with the localities that it is hopeless his aiming at the same simplification of the subject that was possible when speaking of the eastern lines. So much territory of the Bombay Presidency, and of the Hyderabad and Mysore States, intervenes between the Bellary and Canara portions of the 3rd Division that the relation of the western lines of the former to the main approaches to the ports of the latter cannot be exactly defined, intermediate branches dispersing the trade as it moves westwards. The western roads required in Bellary will therefore be considered separately, but their bearings as portions of extensive lines not lost sight of whether in treating of them, or hereafter of the approaches to the ports of the Division.

11. There is already in progress a main line from Bellary to Hosspett, 40 miles in length, whose completion as a 1st class road it is attempted to push forward with all expedition, as from the nature of the country divided by the Soondoor range of hills, it assumes the character of a terminal line with reference to the other chief western roads. Its extension to the Dharwar frontier at Humpsaugur was formerly desirable and in progress, but the late cession of the Raichoor Doab has removed objections to the direct and preferable line by Copul to Gudduk, which will accordingly be substituted, taking the Dharwar extension line out of the limits of the 3d Division.

12. Diverging from Hosspett therefore, the number of 1st class roads it is necessary *at once* to take in hand, the western Talooks being in respect

of roads a "tabula rasa" (to use an expression of the Committee's) are two in number. One to convey the cotton and other produce of Bellary by the best and most direct route to the nearest port on the Western Coast. Another, to connect the Military Stations of Bellary, Hurryhur, and Mangalore (including the Civil stations of Shemogah,) and to promote the traffic of three southern ports of Canara.

13. The exact point on the Dharwar boundary, to which with reference to existing or projected communications in Dharwar or Canara, the 1st line must be taken being fixed in the neighbourhood of Havanoor, it appears very feasible to carry on both lines together to common points of bridging the Chinna Huggry river near Kogala, and passing the Hurponhully hills at Cunnavayhully. There will therefore be a total of only 85 miles of 1st class road to be worked immediately in connection with the 40 miles already in hand, viz:

| | | |
|---|---|---|
| 1. | Hosspett to Cunnavayhully ... ... ... ... ... ... | 40 miles. |
| | Cunnavayhully to Havanoor ... ... ... ... ... | 30 „ |
| 2. | Cunnavayhully to Hurryhur ... ... ... ... ... ... | 25 „ |

14. Of the Havanoor line the Executive Engineer of Dharwar writes, "your proposed line can be met by a 2d class road, partially bridged for "drainage, from Dewgeeree, whence it would communicate with Sedasheghur "by our proposed line, viâ Bunkapoor, Moondagode and Yellapoor, or with "Coomptah by the 2d class road now constructing by the Dharwar Collector "viâ Neergul, Alloor, and Sumusgee." The road to Hurryhur will meet a 1st class road 100 miles in length, bridged throughout the Mysore territory through Shemogah to the Agoomby Ghaut; below which again three divergent 2d class lines already passable by carts lead to the ports of Coondapoor, Oodapee and Mangalore.

15. Of 2d class lines required to open out the western Talooks, the following demand early attention, viz:

| | | |
|---|---|---|
| 3. | Amkoondy bridge to Kogala bridge by Koodlighee. . | 40 miles. |
| 4. | Koodlighee to Toornagul on the Bellary and Hosspett road. ........................................ | 30 „ |

the former of these being a necessary continuation of No. 12 of the eastern list, and the latter a continuation through a gap of the Soondoor valley of a road already in progress in connection with the Raman Droog sanitarium.

16. The Canara communications come next in order, and the most natural as well as convenient manner of classing them, is in sepa-

Canara.

rate groups of main approaches to the different ports with their several feeders and branches as follows, viz:

1st or Singawurree Ghaut Group.

*Main line to be made 1st class.*

1. Dharwar frontier near Hullial to the Sedasheghur river at Boray...... ..................... ............... 60 miles.

*Branches to be completed as 2d class.*

2. Hullial to Tinny Ghaut or Goa frontier and Jugglepett to Sumsody ....................................... 50 miles.
3. Hullial to Yellapoor........................................................ 35 „

Total of 1st group...145 miles.

2d or Arbyle Ghaut Group.

*Main lines to be made 1st class.*

1. Kirwutty by Yellapoor to the port of Tuddry... ...... 60 miles.
2. Branch to port of Ankolah...................................... 18 „
3. Yellapoor by Kyga Ghaut to Mullapoor on south bank of Sedashegur river........................... 32 „

*2d Class Branches.*

4. Moondagode to Yellapoor........................................ 25 „
5. Yellapoor to Sircy............................................ ........ 30 „

Total of 2d group...165 miles.

3d or Coomptah Group.

*1st Class.*

1. Dharwar frontier by Sircy and Devamunny Ghaut to Coomptah, including Sumusgee and Banawassy branches.......................................115 miles.
2. Ambenhully by Neelcoond Ghaut to Coomptah ......... 35 „

Total of 3d group...150 miles.

### 4TH OR GAIRSOPPAH GROUP.

*Main lines.*

1. Gairsoppah Ghaut and road to Talgoopah frontier...... 25 miles.

*2d Class.*

2. Sircy to Siddapoor and Korkanny........................ 35 miles.
3. Gairsoppah to Moordeshwar................................ 15 „

Total of 4th group... 75 miles.

### 5TH GROUP OR NORTHERN COAST ROAD.

*2d Class line.*

1. Sedasheghur by Ankola, Meerjan, Kuttegaul, Chendawer, Honore, Moordeshwar, Bhatkul to Byndoor...... 90. miles.

Total of 5th group...90 miles.

### 6TH OR COLOOR GHAUT GRUOP.

*Main lines.*

1. Mysore frontier near Hunnur by the Coloor Ghaut to Wundasee with a branch to Byndoor......... 45 miles.

*2d Class.*

2. Wundasee to Halandee........................ 15 miles.

Total of 6th group...60 miles.

### 7TH OR AGOOMBY GHAUT GROUP.

*Main lines.*

1. Agoomby Ghaut to Halandee........................ 20 miles.
2. Do. to Oodapee and Mulpy........................ 30 „
3. Do. to Mangalore........................ 55 „

Total of 7th group...105 miles.

8TH OR MANGALORE GROUP.

*Main lines.*

| | | |
|---|---|---|
| 1. Mangalore and Mercara road by the Sumpagee Ghaut, (Trunk road No. 2) | 70 | miles. |
| 2. Munjerabad Ghaut to Poottoor, (Do. No. 4) | 35 | " |
| 3. Bellataugady Ghaut to Buntwaul | 40 | " |

*2d Class line.*

| | | |
|---|---|---|
| 4. Branch from Trunk road No. 2, to the port of Cassergode. | 30 | miles. |
| Total of 8th group... | 175 | miles. |

making a grand total of 965 miles of roads in Canara, the direct feeders of the trade of its ports; whereof 640 miles are of 1st class importance, and 325 miles of 2d class but more than mere local value.

17. The state of each group as regards work done, in progress, or to be taken up is briefly noted as follows.

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1ST GROUP. *North Soopah Roads.*

No. 1. The ghaut finished to 12 feet width, work progressing from its head towards Hullial on an estimate of Rupees 9,850. An estimate of Rupees 35,000 entered in the budget of 1855-56, for its further progress.

No. 2. Estimates of Rupees 5,000 and Rupees 1,000 sanctioned, and work will soon be undertaken.

No. 3. Open as a dry weather cart road, wants bridges and widening.

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2D GROUP. *South Soopah and Ankola Roads.*

No. 1. Open for carts in dry weather, timber bridges on masonry piers in process of construction on an estimate of Rupees 32,000.

No. 2. Open to 12 feet width for carts in dry weather, and furnished with masonry bridges half way out of Ankola, timber platform bridges required for the rest.

No. 3. Trace commenced by Assistant Surveyor Beahen under instructions of the Civil Engineer on a sanction of Rupees 5,000.

No. 4. Open to 12 feet width for carts in dry weather, requires bridging.

No. 5. Imperfectly traced, very narrow and passable by carts with difficulty.

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3D GROUP. *Or Coomptah Roads.*

No. 1. Bridged and completed throughout, with an annual allowance of Rupees 11,000 for maintenance.

No. 2. The ghaut and road being made available to carts, urgently requires bridging.

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4TH GROUP. *Soonda and Bilghy Roads.*

No. 1. 3 yards trace opened and in progress of being widened for dry weather cart traffic on a sanction of Rupees 20,000. After which it will require bridging.

No. 2. 12 feet wide, dry weather cart road, in process of bridging with timber platforms on masonry piers.

No. 3. Untouched, much required to connect south Canara with the Balaghaut.

18. The abovementioned groups are intimately connected with the four western roads of Bellary before treated of; cotton and piece goods being brought down by the latter, in exchange for Salt and Betelnut, &c.

19. And to connect the extremities of the main north Canara lines which are always important ports or cusbah towns with each other and the south of the District, attention must be paid to the

5TH GROUP. *Northern Coast Road.* Small portions of which connected with different lines of road have been at various times improved. But its general state whether as regards trace, or provisions for crossing the numerous rivers it encounters, is very bad, leading amongst other things to great delays in the tappal arrangements.

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6TH GROUP. *Coondapoor Roads.*

No. 1. Two-thirds, including the Coloor ghaut, in perfect order as a dry weather cart road, 12 feet broad, requires completion to Byndoor, and bridges throughout.

No. 2. Almost untouched.

7th Group. *Agoomby Roads.* In good order and fair use as dry weather cart roads. Bridges urgently required throughout.

20. This group is connected by a 1st class road made and bridged throughout the Nuggur District with No. 2, of the Bellary western roads, and the perfecting both ends of the line of communication is a matter of urgency both in a military and commercial point of view.

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8th Group. *Mangalore Roads.*

No. 1. A 1st class road, bridged throughout, and allowed Rupees 100 per mile per annum for annual maintenance.

No. 2. 1st class road, nearly completed, and already much used.

No. 3. Trace of ghaut in progress, and much of the road open to carts in dry weather.

No. 4. Open to carts as a dry weather road, in process of being bridged.

21. Thus although the extent of roads of more than local importance in Canara, (965 miles) is owing to its peculiar shape and situation almost as great as that of the main lines required for the Bellary and Kurnool Districts, together of thrice its superficial extent, for which about 998 miles of good road will at present suffice, yet is there much less to be done in the former District than in the two latter, in which a commencement has been made only with one of the western lines, and by turning to account the labour of the famine coolies the earthworks of 400 miles of eastern roads.

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## 2d SUB-DIVISION, CANALS AND RIVERS.

Navigable canals and rivers.

22. Of these latter as connected with navigation, the Toombuddra is the only one that could be turned to account in the eastern portion of the Division, whether by use of the stream flowing in its natural bed, or by canals taken off from it. Already it conveys from the Nuggur jungles to the neighbourhood of Hosspett a great proportion of the timber and bamboos used in the Bellary District. The increased fall of the stream and obstacles created by the numerous anicuts prevent its further use for some distance lower. But eventually it is understood again to come into play to a small extent in supplying Kurnool with some of the produce of its banks. No doubt, if deemed advisable the whole stream within the 3rd Division limits might be turned to account, but there is no positive information to go upon.

23. A scheme has been entertaind by high authority for intercepting the waters of the Toombuddra at some point, it is presumed at least as high up as Hurryhur, from whence after traversing the confines of western Bellary and Mysore they might be led across Raidroog and the river Huggry into the Pennaur, being made conducive to purposes of navigation as well as irrigation down to the eastern coast. The project is one calculated immensely to affect the welfare of the Ceded Districts, but to carry it out with reference even to irrigation alone, it must be allied with measures for storing the monsoon floods of the Toombuddra in extensive reservoirs amongst the hills and valleys of Nuggur, for the dry weather supply of the river would, it is believed, be very inadequate. At the same time the Toombuddra is the only stream in the country from attention to which any great results may be expected to accrue to the Bellary District. It is therefore of consequence that the project should be thoroughly investigated by qualified persons.

24. In Canara the regularity and copiousness of the periodical rains renders the subject of irrigation of slight importance, though no doubt there are many openings for improving the temporary expedients at present in use to secure water for second crops of the season, and for creating the means of converting one crop or "bett" land into two crop or "byle" land. But in the higher course of their streams, what would most conduce to develope the value of the Canara rivers, would be the introduction of machinery to be acted upon by their constant flow, and in this manner it is difficult to estimate too highly the extent to which the resources of the country are capable of development.

25. In the lower portions of their courses, especially below the points where they are affected by the tides, the Canara rivers are already extensively used for navigation. Very much may be done to improve them by regulating their flow between banks, affording at the same time the means of tracking, and by removal of rocks and shoals. But it is still more necessary that such of them as spread into back-waters parallel and adjacent to the coast, should be connected by canals wherever that is possible. Their very existence is so obstructive to the formation of a good coast road, that it is the more necessary to open water communications available at all seasons of the year between as many as possible of the important towns which are situated on the Canara coast.

26. This District is not so favorably formed for such communications as Malabar, its coast being generally bolder, and presenting many cliffs and highlands to the sea. The most valuable junction canal that could be cut is one that would connect the ports of Tuddry, Coomptah and Honore; and fortunately its accomplishment would be neither difficult nor costly. Coomptah

and Tuddry may be at once connected by a cut of less than 2¼ miles in length, whereof about 1,400 yards is land liable to overflow by high tides, 1,500 yards one crop rice land of slight elevation, and not 1,000 yards across a very low ridge of laterite rock and hard soil, the excavated material of which would pay for its quarrying near such a populous town as Coomptah where stone is always in demand and fetches a high price. Another mile of canal through land under high tide level, would open a short cut for boats descending the Tuddry river with cotton embarked at Oopinputnam. Coomptah harbour, Honore and the Gairsoppah trade would at once be connected by a canal from the former place, between four and five miles in length, led through the low cultivation parallel to the coast to join a branch of the Honore backwater at Haleydapoor.

27. The Coondapoor and Barcoor backwaters might be similarly joined and a small extension northward of the Malabar navigation now ending at Hossdroog might be carried out; possibly also two or three other such works on a small scale might be planned elsewhere to advantage. But there is none in the District comparable to that above detailed for importance, and its exceeding facility of execution helps to recommend it for immediate sanction. One of its effects will be to cause the desertion of the last stage of the Devamunny road, between Kutteegaul and Coomptah, as the execution of only the first mentioned 2¼ miles will elude the difficulty occasioned to traffic by the Dewgah Ferry.

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## 3D SUB-DIVISION, RAILROADS.

Railroads.

28. The question as to the lines of rail through the Ceded Districts may be considered as disposed of, and that in the most satisfactory manner, by the late report of the Inspector of that department, no step could be more judicious than the immediate undertaking of the extension of the grand central line from Bangalore to Bellary in a military and political point of view; and commercially as regards Bellary and Kurnool every benefit that could be attained by a direct line viâ Cuddapah to Madras, will be as well and far more speedily and cheaply gained by one from Bellary to Nellore, parallel to the north bank of the Pennaur river and connected with the eastern coast canal. Branches to Cuddapah and Kurnool meeting near Podatoor will be necessary accessories, the latter forming an instalment of the main north line to Hyderabad.

29. It is presumed that the Bangalore extension will not stop at Bellary, but eventually be carried forward into the Bombay territories. Should its

course be shaped towards the great cotton mart of Hooblee, it may be mentioned that the valley of the Gungawully river now traversed by the Arbyle ghaut and road presents at once the most favorable line for direct communication with the coast, with Tuddry harbour for a shipping terminus, the safest and best port between Goa and Cochin. In like manner, the ravine down which the Munjerabad ghaut is led, will form the most practicable as well as most direct line for a railroad between Bangalore and Mangalore.

30. More need not be said on this topic, as years will elapse before the general introduction of railroads in this country. The only additional practical remarks to be made, are that of the main roads recommended for the Bellary and Kurnool Districts, No. 11 will be totally superseded by the proposed Bangalore and Bellary line, Nos. 1 and 8 by the Bellary and the Nellore line, and Nos. 6 and 10 by a Kurnool branch of the latter. But except as regards bridges for the largest streams on the lines, such as over the Huggry at Permadevenhully, the execution of the roads which can be carried out at once, need not be laid aside while the lines of rail are only being discussed. The short line, No. 8, especially, affording that direct access to the eastern coast which Bellary stands so much in need of, will not bear postponement.

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## 2D HEAD. IRRIGATION PROJECTS.

Works of Irrigation.

31. This subject has been partially discussed under the head of canals, with which in this country it has so much affinity; and it has been explained that nature does so much for Canara as to obviate the necessity of any artificial aids requiring special notice. With Bellary and Kurnool the case is far otherwise. Under Native rulers, works were constructed on a large scale for utilizing the waters of the Toombuddra; such of these as were completed have been kept up by our Government but under management such as, it may safely be said, would not have been allowed under Native rule. Repairs are either neglected, or made without system or the means of check, and the channels have greatly deteriorated, and the cultivation under them diminished. A proposal is already before Government for organizing an establishment to take under its charge three of the channels that have been most carefully examined, the whole eventually to fall under the same management. And arrangements are necessary for the repair under one management of the anicuts on which the channels depend for their supply, now partly in our hands and partly under the Hyderabad State.

Since sanctioned.

32. Great local benefits, it is believed, may be realized by judicious

treatment of the Huggry and Pennaur rivers. The former it has been proposed to dam at Yaparaul, and the latter in the higher part of its course at Roddum, and again where it opens out of the hilly country near Paumdee. No attempt can at present be made to investigate these projects and to present them in a working shape for approval and execution, separate agency being required for that purpose.

33. Besides these, there are other lesser streams, the waters of which may be turned to great advantage, but the above instances will suffice. In the Civil Engineer's annual report of important works of the 3d Division for 1853, will be found in detail all the information at present available on this important subject. And in the reports of the Commissioners on Public Works are embodied all the best notions for the improved management of tank repairs, a matter of infinite importance to these Districts in which a great falling off is observable from the work of former days, and which when very slowly recovering the effects of disastrous floods in 1851, were again laid prostrate by the famine of 1854.

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## 3D HEAD. PORTS AND HARBOURS.

Western ports of the Division.

34. Those requiring notice in this paper are Sedasheghur, Bellikerry, Gungawully,* Tuddry, Coomptah, Honore, Bhatkul, Coondapoor, Mulpy and Mangalore.

35. Both the river and harbour of Sedasheghur are capable of improvement to a certain degree, the former by embankments, wharfs and jetties, and the latter by the adoption of means to move the position of its bar further south and keep it from shifting again which it is supposed may be effected by a simple groin thrown out in prolongation of the foot of the Fort rock. The Survey of the port just completed by Lieutenant Taylor, of the Indian Navy, will give the best possible means of laying down such works as will really answer the purposes desired, and advantage is being taken of his presence on the coast to get all the necessary information. The results will be submitted for approval in due season, and no doubt they will receive such attention as is due to the interests of a port so favourably situated with reference to the cotton growing Districts inland, and of such good natural capabilities.

36. Just below Sedasheghur and forming an inner recess of its bay there

* Inadvertently omitted in the text. A small harbour with a very difficult bar at the entrance, only resorted to for the teak and other timber floated down the river of the same name and which is navigable to limits of tide water, (12 miles,) for small boats.

is good shelter for vessels to lie up during the prevalence of the south westerly winds that are sometimes so destructive to life and property on this coast. To secure protection against north westerly gales it has been suggested that the island of Coormaghur should be connected with Sedasheghur fort by a solid stone quay. At present the bar is north of the island and fort, having greatly altered its original position, and there is very shallow water (4 feet at low springs) between the former and the sand bank of the river. If materials were collected and means provided, so as to carry out the whole work in one season, it would not be one of either great difficulty or cost, as rough stones heaped up a little above highest tide mark would suffice to secure the object. A single monsoon allowed to intervene would materially affect the operation by its action on the bottom surface not already secured, and on the exposed ends of the portions performed. After all it is doubtful whether the object in view would be permanently secured, as the ultimate effect would be that the coast line and bar would move forward till abreast of Coormaghur, and a triangular space between them, the old coast line, and jetty, become an accumulation of sand, through which the river would find perhaps a more awkward course than now.

37. The idea however, of uniting Coormaghur with the main land so as to make available for laden vessels, the deep water alongside it, is too good to be abandoned altogether. Limiting our operations for the present to works within the river mouth, it may hereafter be necessary if the port should become one of direct shipment for Europe to connect the island with what then should have become the north point of the harbour by a jetty or pier allowing free passage to the water and sufficiently raised above it on screw piles. The length which such a structure would have to span in the open bay is 1,500 yards, and perhaps 500 yards more of backwater to meet a solid stone groin of 250 yards in length which would form one of the works to be executed in the first instance.

38. Bellikerry bay is one that would appear to have great capabilities of usefulness, its northern portion being well sheltered from norwesterly winds, and some protection afforded from southwesters at its other extremity, which might be increased by connecting the nearest island to the mainland without much fear of lessening the depth of water inside. The trade hitherto carried on has been very insignificant, but should the port be made more accessible from inland by a short branch of the Arbyle and Ankola road, and the latter be bridged throughout, it may be more resorted to. Sedasheghur however is that which should first be attended to, the river navigation making it more valuable to the trade from Dharwar and Hooblee to which the two new ghauts in progress on each side of the river will make it very accessible.

39. Of Tuddry harbour the fullest information has just been obtained by the surveys of Lieutenant Taylor, from which it appears to be the most valuable port on the Canara coast, wanting nothing but European enterprize to make it the emporium of the Cotton trade instead of its neighbour, Coomptah. With two ghauts, the Arbyle and Devamunny, open to cart traffic, leading the first directly down to it, and the second to the head of its valuable river navigation, it is only the value of the capital invested in godowns and houses at Coomptah and the slight interest felt by the Native Agents of the latter port in facilitating the trade, that Tuddry has not long since superseded Coomptah. Beyond a Light House, and beacon to mark the passage of the bar, and the means of warping vessels in, it seems that little or nothing is wanting to facilitate the entrance of vessels drawing 10 feet water at lowest tides, for it is accessible in all winds, and already forms the harbour of refuge to vessels lying in Coomptah roads when bad weather is apprehended. Something may possibly be done inside the river to increase the available amount of deep water by judicious encroachments on the portions left dry at low tide. But these must be carefully planned, and may succeed and not precede a greater resort to the port, which it is again repeated must be induced by European example.

40. Coomptah is no harbour, but an open roadstead, in which vessels that come for Cotton lie exposed to every wind. The Custom House and town lie one mile up a narrow creek nearly dry at low tides. The amount of capital invested here is sufficient reason that as much as possible shonld be done to facilitate access to the shipping, and the speedy embarkation of goods, however preferable it might appear that other parts should be resorted to.

41. The necessary works have already been described and partly planned and estimated for, in a report on Coomptah prepared by order of the Madras Government in 1852; they consist in the excavation of a canal from the mouth of the creek to the Tuddry river opposite Meerjan, a work much required on other grounds and recommended under the head of canals, in this paper, and the effect of which would be to open the river navigation of the Tuddry to this port, and remove the obstacle to traffic caused by the Dewgah Ferry. The removal of the Custom House to the Light House hill at the mouth of the creek, so that goods brought down by the canal may be examined with the least possible delay and expense, and the construction of a good wharf, complete what is at present required. The former work has been roughly estimated in the Budget of 1854-55, and the two latter in that of the following year. All should proceed simultaneously, and good superintendence be afforded for their execution.

42. Honore harbour is a very good one for boats of a certain size, and its bar has been most successfully fixed in a convenient position by the action of a groin thrown out from the land side of the backwater at the Custom House. Its connection with Coomptah and Tuddry by means of canals (before mentioned) is all that remains to be done.

43. Bhatkul is mentioned rather as a large and important trading town, frequented by a peculiar sect of Mussulmans, called Nevyets, whose dealings extend over the Presidency, and of whom this place is the Head Quarters. The port is not susceptible of improvement except as at Coomptah, by giving facility of access to it from the town, removing the site of the Custom House, and erecting shipping wharfs. It is clear enough what should be done; the difficulty is to get the work properly planned, for want of skilled assistants.

44. Coondapoor has been left entirely to itself, and nothing is known as to the state of its harbour comparatively with former times. Whether its bar has shifted much or not at all, for the better or worse, is not known; it seems to be adequate to the local trade carried on. But very great changes that have been observed in the backwaters lead to a suspicion that changes are in progress at the harbour mouth. It is hoped that the prosecution of Lieutenant Taylor's surveys will clear up the ignorance on these points.

45. Mulpy, the port of Oodapee, is a roadstead sheltered by the Dhurria Bahadoor Ghur and other islands, of which possibly something like a harbour of refuge might be made. But till surveyed its capabilities will remain unknown.

46. Mangalore harbour is in character like Honore and Coondapoor. Large vessels lie outside, while only small craft can load within; the roadstead is quite exposed and incapable of improvement. A northerly movement of its bar, long in progress, but greatly accelerated of late, having advanced to such an extent as to cause the destruction of valuable land and to threaten more, preventive measures have been suggested and ordered to be carried out. The bar once fixed, improvements to the landing places, wharfs, &c., are all that will remain to be made, which can gradually be provided for by plans and estimates to be included in the annual budgets.

47. In concluding this cursory view of the harbours of the 3d Division, the opportunity is taken of pointing out that the first requisite with regard to them is their accurate survey. This duty belongs to and can only be efficiently performed by the Naval Department, and as regards the outer configuration

of the coast is in process of execution by Lieutenant Taylor. But it must be remarked that this is not sufficient for our purposes, which demand that every navigable river shall be surveyed from its mouth to the limits of tide water which are also those of its practical utility to trade in its natural state. Permission has been granted to Lieutenant Taylor by the Bombay Authorities, at the instance of the Government of Madras, to survey within the mouths of the Sedasheghur and Tuddry rivers for a short distance. But the sight of his valuable charts only creates a desire for fuller information as to the nature and course of our large rivers, that the means of improving them may thence be derived. It is therefore urged that further application be made to Bombay to permit the extension of Lieutenant Taylor's valuable services to the survey of the rivers connected with all the ports above enumerated.

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General remarks.

48. With a painful consciousness of the vagueness of much that has been said in this paper, arising partly from want of acquaintance with large portions of the Division, and still more from the lack of a properly qualified agency for the investigation of its wants, a few words more must be hazarded as to the changes and additions that it is expedient at once to make to ensure some degree of efficiency in carrying on engineering operations.

49. In the first place, the enormous size of the Division, and the separation of one of its Districts from the other two, render it too large a charge for one Civil Engineer, in spite of any amount of assistance. In the attempt to visit the main works of a Division 23,000 square miles in extent, requiring nearly 2,000 miles of main communications, and the chief town of one of whose Districts is 400 miles distant from the chief town of another, the Civil Engineer and his Office Establishment are harassed with incessant marching, in the course of which it is difficult to keep pace with the ordinary routine work of the Division, and they are exposed to the difficulties attendant upon the total difference of the countries they pass through as regards climate, means of carriage, people, and language.

50. It is proposed to remedy this evil by dividing the District into two separate charges, as nearly as possible coinciding with the natural Divisions of race and language. That is, by constituting Canara, and the four western talooks of Bellary one Division, the remainder of Bellary and Kurnool, another. The channels of the Toombuddra, and numerous tanks of western Bellary will afford that practice in irrigation work, and change of employment during the south west monsoon which is desirable with a coast charge; and the rest

of the present Division it is evident is naturally adapted to be under the same engineering management. The eastern and western roads of the Division, as enumerated before, harmonize with the proposed change.

51. The Civil Engineer of each of these new Divisions will require to help him in the discharge of ordinary duties, one Engineer Assistant and two Surveyors, while for special works like the Toombuddra channels, and Huggry anicut or Ghaut tracing and harbour, river, or road surveys, probably another of each of the above classes of trained assistants would be required, i. e., a total of two Engineer assistants and three Surveyors to each Division. Very effectual work is got out of the Revenue Surveyors as at present trained, when they are properly kept in hand, and their duties allotted with an eye to their execution in due order. If however they find themselves at a distance from central authority, without a distinct range of duty allotted them, and without frequent intercourse by letters and reports with their superior Officer, they are apt to neglect their work. In many cases however, this arises more from opportunity, and from want of supervision than from innate defects of the class.

52. For the creation of an Executive Department charged with the speedy completion of the roads and bridges of the Division, experience has shewn that it is in vain to rely upon drafts from the commissioned or other ranks of the army in general, as in so many cases it happens that promotion either regimental or to other employ, or Foreign Service, or the necessities of their corps, causes their withdrawal at the very moment when they have gained some aptitude for the work, experience in construction, tact in management of men, and acquaintance with the local language. Recourse must be had to an extension of trained European agency, and the introduction of a well paid Native agency. The non-commissioned ranks of the Sappers and Miners furnish some good men for the former branch, and an application has already been made to Government to allow funds for securing the services of German Artificers of high qualifications and moral character, such as have already been secured in one instance for a Canara work. In that District also, it is proved to the satisfaction of those who have the management of the public works that very much may be done with Native agency. Not such as the works of the Revenue Department have ordinarily been carried on by men, however able and honest, whose other more important duties, Revenue and Police, were more than enough to occupy their whole attention; but a separate class trained under Engineer and other Executive Officers to a system of order and punctuality, instructed sufficiently to carry out road and bridge work when the necessary traces have been made and plans furnished by the Engineer Department, and incited to honesty in their dealings with the labourers, and zeal in

carrying out the works intrusted to them, by salaries proportionate to the responsibility imposed upon them and the hard work and discomforts they have to undergo.

53. It is suggested for the training and support of such improved agency that permission be at once given to the Civil Engineers to lay out Rupees 100 a mile annually on all the main lines above mentioned in the 3d Division as fast as they could make their arrangements for tracing, planning, and superintendence. In this way a little would be doing by degrees all over the country towards bringing each line into perfect order; those not yet marked out would be traced immediately greatly to the facility of planning the masonry works afterwards to be built on them; others that had been traced as bridle-paths would be opened as bullock roads, and eventually to full width for cart traffic. Of course bridges and large drains could not be built with this sum, but no doubt the whole of the earth works would be performed in a few years in Districts like Canara where the soil is so favorable that after the Engineer Department have found the opportunity of making the necessary traces, a couple of hundred Rupees, sometimes half that amount, per mile, enable the line to be used by carts, and immensely ease the traffic carried on by laden cattle.

54. A proportion of this sum, say one Rupee a mile monthly, set aside for training and supporting permanent superintendents, would insure a supply of good men for the Executive Department. These might be appointed to particular road circuits, which could be averaged at 150 miles, for the portions of which whereon work was actually to be done during the year they would receive one Rupee monthly per mile, rising in time to the full salary for maintenance and repair of the entire circuit when completed. Incidental works, such as bungalows or other public buildings at the stations through which their roads passed might eventually be transferred to their executive charge, to the great relief of the Revenue Department; and many useful works in harbours and at Ferries might be carried out through their agency subordinate to the Civil Engineer.

55. The entire annual expenditure, without detailed estimates, but to be carefully accounted for, proposed to be incurred under this system would be Rupees 80,300 for the Kurnool and east Bellary roads, whereof Rupees 40,900 or more than one half has already been recommended for sanction to the Bengal Government. For Bellary western roads only Rupees 19,500; with which sum at the Civil Engineer's disposal, not three months would pass without a good be-

Since sanctioned.

ginning being made of those hitherto neglected lines. For Canara, Rupees 96,500 a year including all present permanent sanctions* would afford the means of completing the network of main roads in a comparatively short time. It is the want of any adequate fixed allowance for the District and discretionary power of expenditure over it that have retarded progress hitherto, especially progress in training a subordinate Executive Department.

* Upwards of Rupees 50,000 per annum.

(Signed) GEORGE WARREN WALKER, LIEUT.,
*Civil Engineer 3d Division.*

CIVIL ENGINEER'S OFFICE,
3D DIVISION,
CANARA DISTRICT,
SEDASHEGHUR,
24*th February*, 1855.

## LETTER FROM CAPTAIN COLLYER, CIVIL ENGINEER 4TH DIVISION, TO MAJOR J. H. BELL, SECRETARY TO THE BOARD OF REVENUE D. P. WORKS, DATED RANEEPET, 5TH JANUARY 1855. No. 30.

SIR,

With reference to the order forwarding a copy of a Collective Memorandum on Public Works in the Madras Presidency, and desiring me to report on my Division more particularly ; I have the honor to forward the following outline of what may be advantageously done for the improvement of the District.

1st. Roads new and improvement of old.

2d. Irrigation, its restoration, extension or new works.

2. It is unnecessary to remark upon the trunk roads traversing the District further, than that they are three, one going from Madras, south through Chingleput to Trichinopoly. A second from Madras west ; through Poonamallee, Raneepet, Vellore and Vaniembady to Bangalore ; and the third from Madras north through Sooloorpett to Nellore ; from the second, there branches off a trunk road from Raneepet to Bangalore by Chittoor, and at Chittoor, another trunk road branches off to Cuddapah by Damulcheroo, these roads are under a separate department and are kept regularly in repair.

3. Lately a road (proposed to be given over to the Superintendent of Roads) has been constructed from Vellore, falling into the Raneepet and Chittoor road at Punnatore, thus connecting Vellore and Chittoor, with these exceptions the District may be said to be without communications ; the tracks on which traffic labours along in the dry weather, have hitherto without exception been next to, if not quite impassable in the rains—during the last four years measures have been taken to improve the most important tracks, and the following are under repair, and will, though very far indeed from good roads, materially improve the District in its greatest want ; the roads now under repair are the road from Cuddapah to Madras entering this Division at Balapully ; intended to be thoroughly constructed ; a road from Conjeeveram to Tindivanum, through Wandavash, under construction.

A road leading from the South Arcot and Salem forests, entering this District at Calispauk and leading through Poloor diverging at Arnee to Vel-

lore and Arcot, is having its worst parts repaired, a road from Chingleput through Conjeeveram joining the western road at Soorupens-chuttrum has been reconstructed. A road from Pootulput 10 miles from Chittoor on the road from Chittoor to Cuddapah by Damulcheroo to Kurcumbady is under construction.

A road from Wallajahnuggur to Sholinghur is under construction.

A road from Saint Thomas' Mount to Poonamallee is under construction.

A road from Poonamallee to Ramungerry being part of the road from Madras to Cuddapah by Nagery is also under construction.

4. These when finished will very materially facilitate commerce. There is wanted, and estimates are in the course of preparation or already made, for the following :

A road from Kurcumbady to Naidoopet ; this will complete the communication from Chittoor by Pootulput, Chundragherry, Triputy, Kurcumbady, Calastry with the northern trunk road at its entrance to the Nellore District.

5. There should be a road from Nagery to Tritany, and thence to Conjeeveram. By means of it, there would be a direct road from Cuddapah to Trichinopoly through places important, not only for commerce, but for the thousands of pilgrims to Triputy, Tritany, Conjeeveram, Seeringum, &c. It moreover crosses the railway ; and would afford the most direct opening to it, from the country north of Nagery. Tritany should also be connected, but with a less perfect road, to Sholinghur, and Sholinghur again with Chittoor by Ponnay.

6. Sholinghur is connected with Wallajahnuggur as already mentioned ; and I had thought Colaterry where the railway crosses it would have been the proper place for a station, but the rail crosses the road very obliquely and it will be necessary to have a station at Ammoor. The case is this : if the station be at Colaterry the traffic from Wallajahnuggur to Madras will travel four miles of common road, four miles being the distance of Colaterry from Wallajahnuggur, but the western traffic would have to travel four miles by common road and two by rail, Ammoor being two miles west of it, instead of only 2½ miles on the common road, Ammoor and Wallajahnuggur being 2½ miles apart ; and Raneepet would be thrown out by a very considerable detour, again Bannaveram is the proper railway station, for eastern traffic from Sholinghur, thus there will be a necessity of making a branch from Perancanjee, a place on the Sholinghur and Wallajahnuggur line, to Bannaveram, a piece of road from Wallajahpet to Ammoor, and another from Raneepet to Ammoor, these roads will supply the principal wants of the northern portion of North Arcot. Second class roads should however, eventually be made from Nagery to Nagalapoorum and Sut-

waid. In the western portion there are required a road from Palmanair to Vencatagherry Cotah, estimated for; a road from Cuddapanuttum about half way between the abovementioned places to Goriattum, to enable the large, and constantly increasing produce of sugar to be taken to the railway; the Syenagoontah ghaut should be opened, for the same purpose.

7. A road is also required and estimated for between Chittoor and Goriattum and another from Goriattum to Pullicondah is also estimated for, these may be said to be the requirements of the western portion of the District.

8. In the south the road above alluded to from the Salem and South Arcot forests through Calispauk, &c., should be entirely completed; from Arnee to Vellore and from Arnee to Arcot estimates have been made, as also for a bridge across the Palaur at Vellore, to connect the southern bank of the Palaur with the railway; a road from Arnee across the Cheyaur anicut to the South Arcot frontier, and so on to Tindivanum is required; and another from Wandawash through Trivattoor to Arcot. A road from Tetry, a place on the road from Conjeeveram to Wandawash, through Ootramulloor to Chingleput, and from Chingleput to Sadras is necessary, and also a road from Wallajahbad to Vendaloor; this would go far to, if not entirely, meet the wants of the south portion of the District, there should be a road from Oodialoor to Trivelore, thus connecting that part of the country with the railway at Dacombode, another from Sutwaid to Perimet Chuttrum opening up the talook to the northern road, for northern traffic; and another from Sutwaid to Periavoil to the northern road, there, opening up the south of the talook to Madras, this may be considered as perhaps completing the more immediate wants of the eastern portion of the District.

9. The necessity of these roads is obvious. Their value, commercial, agricultural, political, have been fully pointed out by the Collectors; and I feel that it would be mere repetition to say more on the subject. In a short space of time these principal lines may, if desired, be completed, opening up very probably a necessity for roads where such want is not now felt or even anticipated.

10. Of the works of irrigation it must be observed, that this District may be said to be a tank district, the rivers having occasionally water in them, probably for not more than three or four months, and often not even that during the year; the tanks are numerous and though not so large as some, in other Districts, still of very considerable size and with the exception of those totally destroyed the larger are in good and most of the smaller in fair work-

ing order; some few are provided with river channels but by far the larger portion are dependant on local rains, causing a very fluctuating revenue, and impoverishing the cultivators, the talooks of Goriattum, Vellore and part of Trivullum are tolerably well off, the tanks the more important at least, have river channels but they, as also the larger proportion of the river channels in the two Collectorates, have not been sufficiently attended to, have received less instead of more attention than the tanks; they are constantly being breached for want of head sluices, and are insufficient in width to draw off a good supply, the want of head sluices is however being gradually rectified; in these talooks of Vellore and Goriattum, no doubt I shall be able to find in the gorges of the adjacent hills, facilities for storing water, but I have not yet had the time, for making these explorations, or Surveyors for the necessary surveys, though I hope to find sites for reservoirs, I am not very sanguine as to any great success in securing a regular supply of water the rivers draining no length of country.

11. The Sholinghur talook, hitherto entirely dependant on rains, has now a channel from the Ponnay river, it is contemplated to erect an anicut across the Ponnay, and extend these channels to almost every tank in the talook; and to construct a sort of reserve tank in the natural basin at Caricol, which will hold 22,000,000 cubic yards of water; the channels on the right bank will fill many tanks in Trivullum.

12. The Palaur anicut will be another great source of benefit to the country between the Palaur and the Cooum, nearly all the way to Madras, the Casaverum anicut across the Cortiliar for turning water through the golden channel into the Cooum, and the Coratoor anicut across the Cooum carrying water by a channel to Chembrumbaukum will I hope place all that part of the country in comparative security, and on the south bank of the Palaur, the talooks of Arcot and Trivelore will be benefitted by the anicut works. In the western and southern parts of the District of North Arcot the works in Poloor hitherto very much neglected are in process of repair; an anicut across the Cheyaur just below the confluence of the Velva Arnee river would not only very materially influence Poloor but Wandawash, a talook which may be said to be entirely dependant on rains; its only river the Sookanuddy, if such a stream can be called a river has no extent of drainage; I have written upon the subject to the Board, but at present I have no means of carrying out the necessary surveys, when this is done and the channel from the Cheyaur turned into the Sookanuddy many important tanks will be supplied and valuable extensions made, some of which are already estimated and proposed under any circumstances to be undertaken, the channel and anicut will also materially affect the Caroongooly talook in the Chingleput District.

13. The Cheyaur channels supplying the southern portions of Trivattoor and northern and eastern extremity of Wandawash, are to be extended and widened, the Trivattoor talook north of the Cheyaur, together with the southern and eastern portions of Arcot will be commanded by the Palaur anicut, as will also the portion of Chingleput lying immediately between the Cheyaur and Palaur at their confluence.

14. I have prepared plans and estimates for the restoration of the large ruined tank of Mahundravady capable of holding 62,000,000 cubic yards of water and for this, I now contemplate a channel direct from the Palaur at the anicut instead of taking it off from the Cauverypauk tank, this abstracting so much more for the eastern talooks of Sydapett, Mahimungalum, Chingleput and Terooporoor, these works will cost 150,000 Rupees.

15. The works above enumerated some of which are sanctioned, may I trust be carried out entirely, within from three to five years from this time, they will go far to place the whole of the Districts south of the Cortiliar in a favorable position for securing water, for all the tanks in that portion of the District; it is true that I have thought some channels might be taken from the Palaur above Pullicondah, and some channels just to the east of it might be re-opened; and the subject is under investigation; also that the Ootramulloor channel might be made much more useful; that an anicut might be built on the Cleear above the Caroongooly tank for filling a few tanks near Tundalum, that another might be made across the Cleear below Caroongooly for the lands of Kanar, but there are smaller projects and influencing the District only locally.

16. I have thought that it would be well, and I have made some enquiries, to construct an anicut across the Nagery river at a place called Tumbool, there is a vast plain extending eastwards below this, which could no doubt be well commanded, this will, so soon as I can, be fully investigated; the ruined tanks of Pullicondah, Peddamuddagoo, Bommasamodrum are well advanced and will be finished no doubt and in use by the next monsoon; the ruined tanks of Auknamput, and Nagaputta are finished; the first entirely and the latter as much as was contemplated at present; other less important tanks in Triputy, entirely ruined, or much neglected, have been or are in course of being restored; and in the north eastern portion of Chingleput a flat sandy tract, liable to inundation from the river, river embankments have with much benefit been in many places constructed.

17. The wants of the District in navigable canals will probably be reported upon by the Superintendent of Canals, at present its canal navigation

extends from Sooloorpet and Cusbah Covil to Madras; and is about to be extended from Madras southwards to the Palaur, and eventually on southwards, these canals run parallel to the sea, and at no distance from it; I do not anticipate from the want of water that canals can be constructed at any moderate cost for inland navigation westward from the sea; the District is however in its greatest length traversed westward by the railway.

I have, &c.

(Signed) G. C. COLLYER, CAPTAIN,

*Civil Engineer 4th Division.*

## LETTER FROM CAPTAIN W. H. HORSLEY, CIVIL ENGINEER, 8TH DIVISION, TO T. PYCROFT, ESQ., CHIEF SECRETARY TO GOVERNMENT, FORT SAINT GEORGE, DATED VEERAPANDIEPUTNUM, 9TH MAY 1855. No. 170.

SIR,

1. As directed in the Extract from the Minutes of Consultation, No. 413, dated 28th September 1854, I have the honor to report my opinion regarding those projects proposed by the Chief Engineer and other Officers in a Memo. dated 5th July 1854, which affect the Districts forming No. 8 Division, and to offer a few suggestions for the improvement of this part of the country which occur to me in connection with the above Memo.

2. To begin with the subject of communications. The Committee I observe have suggested in para 22 of their Memo. that trunk road No. 8, (No. 4 in the Madura and Tinnevelly District road map) should be extended through Madura and Palamcotta to the Arambooly pass in Travancore, more however for the sake of military and political purposes than with any view to benefit commerce, as they do not look upon it as one of much, if any, commercial importance. In this, however, I am inclined to differ from the Committee, for I believe its importance in a commercial point of view is very much underrated. My duties take me constantly up and down this road, and I have frequently seen as many as 50 and even 100 bandies moving in company along it. The fact is, the tendency of the trade of Madura is not so much east and west (as the Committee suppose) as north and south, strange as this may seem with the sea coast on its eastern border. Nevertheless the greater part of the cotton of Madura finds its way down south to Tuticorin, in Tinnevelly, as the shipping port, and a considerable quantity of its spare grain is carried on carts along this very road to Tinnevelly during seasons of scarcity, such as occurred last year, and large quantities of piece goods, jaggherry and other products of Tinnevelly are conveyed along it to Madura and Trichinopoly. The return of traffic on this road between Madura and Thiroomungalum (the first stage south of Madura) from the 1st March to 30th April 1854, furnished to me by the Collector of Madura shews that in these 2 months, 3,655 laden and 2,148 unladen bandies passed along it, the value of the commodities carried on the former being Rupees 1,46,930-14. Again, the return of traffic furnished to me by the Collector of Tinnevelly in 1853, gave Rupees 13,94,268, as the value of articles

carried along this road, of which ⅓d was carried to and from the neighbourhood and the remaining ⅔ds to and from a distance. It is evident from these returns of traffic that the road in question is one of considerable importance in a commercial, as well as in a military and political point of view, and therefore ought to have as much attention paid to it as the remaining portion of the line between Madras and Trichinopoly. The greater part of it may be considered as "made road," and with the exception of the Vigay river the whole of the rivers and streams by which it is intersected will ere long be bridged. It is my intention to forward shortly for sanction an estimate for constructing a bridge across the Vigay at Madura. The want of one is becoming more and more felt. In October and November last the Vigay was not fordable for several days together, and all traffic was at a stand still and the post delayed. The total distance traversed by this road in No. 8 Division is 185¼ miles, of which 80½ miles are in Madura and the remainder in Tinnevelly. An annual allowance of Rupees 10,712-10 is required for keeping the Madura portion in order, and Rupees 15,139-15, for the Tinnevelly portion. The latter sum will require to be increased as the made road is extended.

3. In para 24 the subject of keeping made roads in order is touched upon by the Committee, and I quite agree with them in thinking that a road once made should be looked at once as dead stock; a public work in fact, and taken care of as such. With this view I have lately submitted to the Board of Revenue in the Department of Public Works, a return of all the roads in in this Division, shewing what portion of each is made, and the amount of annual outlay required to keep the same in good order. The following is an abstract of the estimate, viz:

MADURA.

| | | | |
|---|---|---|---|
| For keeping 574½ miles of made road in order.... ....Rupees | | 84,280 | 4 |
| Superintendence ... ... ... | „ | 2,715 | 0 |
| Total for Madura... ... ... | „ | 86,995 | 4 |

TINNEVELLY.

| | | | |
|---|---|---|---|
| For keeping 257¾ miles of made road in order. ... Rupees | | 40,806 | 1 |
| Superintendence....... ....... ... | „ | 2,715 | 0 |
| Total for Tinnevelly......... ... | „ | 43,521 | 1 |
| Total for No. 8 Division......Rupees | | 1,30,516 | 5 |

It must be borne in mind that the amount required for keeping made roads in order will of course increase annually in proportion as new roads are made.

4. In para 25 the Committee advert to a scheme for connecting every cusbah town of a District by a gradual outlay of 20 Rupees per mile per annum for each road, and I am inclined to think it would be a very good way of providing each District with tolerable roads, to be improved as opportunity offers, and the amount of traffic appears to demand. Nearly all the cusbah towns in Madura and Tinnevelly are connected by roads more or less made. Those in Madura have had a good deal of money laid out upon them from time to time, but for want of annual repair, some of them are little better than common bandy tracks. This is more particularly the case in the Ramnad Zemindary.

5. In Madura the most important roads are :

No. 1. Connecting Trichinopoly with Dindigul, and for which an estimate has been forwarded for sanction.

No. 2. A continuation of the above, connecting Dindigul with Palghât, the greater part of which is made.

No. 4. Connecting Madura with Trichinopoly on the north and with Palamcotta on the south. All of which may be considered as made.

No. 13. A salt road connecting the port of Tondi with Dindigul.

No. 14. Connecting the same port with Madura.

No. 15. Connecting Paumben with Ramnad and Madura and the latter with Dindigul.

No. 16. Connecting Madura with Thiroochuli and the southern salt pans.

No. 18. Connecting Madura with Pereacolum and the foot of the Dindigul valley.

No. 27. Striking off from No. 16 at Cariaputty and uniting with the branch cotton road at Aroopoocotta.

This last requires to be made on estimate, and it is my intention to submit estimate for insertion in the budget of 1856-57. The remainder are all more or less made, and for the repair or improvement of some of them estimates either have been, or are about to be submitted. I have it in contemplation also to submit for sanction estimates for roads Nos. 17, 19 and 23, the two former connecting Dindigul with the cusbahs of Nellacotta and Pereaco-

lum, and the latter connecting Nellacotta with Streevellapoothoor, a very populous cusbah town in Tinnevelly.

6. In Tinnevelly the most important roads are :

No. 4. Connecting Palamcotta with Madura on the north and with Travancore on the south.

No. 5. Connecting the cotton Districts with the port of Tuticorin.

No. 6. A branch cotton road, commencing at Aroopoocotta in Ramnad and uniting with the trunk road at Ettiapoorum.

No. 8. Connecting Palamcotta with the port of Tuticorin.

No. 12. Connecting Palamcotta with Trichendore on the coast and the port of Coilputnam.

No. 18. A cross cotton road uniting with the trunk at Ettiapoorum.

No. 24. Connecting Palamcotta with the port of Colasagraputnum.

7. The improvements more immediately required in Tinnevelly are 1st, To connect the cusbah of Streevellapoothoor with that of Thiroomungalum in Madura. 2d, To improve roads Nos. 1, 2 and 9, connecting the cusbahs of Streevellapoothoor, Sunkerninarcoil, Thencausee and Tinnevelly respectively. 3d, To construct a good metalled road to connect Palamcotta with the port of Tuticorin, for which an estimate of Rupees 67,363-10, has been prepared and will be submitted shortly for sanction. 4th, To construct a similar road from Palamcotta to the port of Colasagraputnum. An estimate of Rupees 69,460-2, for this line is about to be submitted for sanction. 5th, To complete the construction of road No. 4, between Santoor and Virdooputty and between Goingoondan and Shady Khan's chuttrum. Estimates for both portions are prepared, and will be forwarded shortly for sanction.

8. In para 31 the Committee strongly advocate the prolongation of the coast canal across the Tritrapoondy talook of Tanjore by Ramnad to a terminus at the port of Tuticorin in Tinnevelly. As far as I know of the line to be traversed by the canal, I am of opinion that it is perfectly feasible and would be attended with great advantage to Madura and Tinnevelly. I do not see however why it should stop at Tuticorin. There is nothing to hinder it being carried on 30 miles further south to the port of Colasagraputnum and eventually perhaps to Travancore. It was in contemplation in 1828, when Colonel Morrison was Resident at Travancore, to extend the Trevandrum canal southward to within four miles of Cape Comorin, and an estimate of between three and four lacs of Rupees was framed by Lieutenant, now Lieutenant Colonel Green of the Engineers for the purpose, but it was never commenced. Could this be effected, it would then be very desirable to carry on the Eastern Coast

Canal to join the Western one at Cape Comorin, and so complete the circuit of the Peninsula.

9. I am further of opinion that a canal 20 yards broad at bottom could be constructed along this portion of the coast for the sum mentioned in para 63 of the Committee's Memo., viz., Rupees 10,000 per mile, but I am doubtful whether the requisite supply of water could be obtained from the interior of the country by the formation of reservoirs, &c. I rather think it will be found necessary for the most part to supply the canal from the sea.

10. In paras 54 and 55 of the Memo. it is suggested that probably the Vigay and Tambrapoorney irrigating channels may be made navigable. I think it possible that some of the principal channels from the Tambrapoorney might be made navigable for seven or eight months in the year, but I am not so sanguine in regard to those taken off the Vigay. This latter river is very shallow, and except during the monsoon rains has not more than a few inches depth of water in it ; and the whole of that is required for irrigation. An attempt was made in 1838 to turn a small stream (the Chinna Mooliaur) a tributary of the Perryaur in Travancore, into the Sooroolyaur, which joins the Vigay near Ullinagrum, in the Thenkurray talook, but the work was ultimately abandoned in consequence of the coolies suffering greatly from fever. On two subsequent occasions I have myself visited the hills above Cumbum to ascertain if it were practicable to obtain any additional supply of water from the rivers which run westward through Travancore, but without success. I do not therefore see that there is any chance of our being able to obtain a sufficient supply of water to render the channels from the Vigay navigable for any length of time. The Tambrapoorney channels are tolerably well supplied with water during both monsoons, and as they in general overlap one another, a continuous line of canal might be formed from Culladacoorchy, the first town of any importance on the river, to the Murdoor anicut, a distance of forty miles, and thence along the river to the sea at Pinnacoil ; or by branch channels, having their heads at Streevigoontum, to Tuticorin on the north, and Colasagraputnum on the south, the two principal sea-ports of the District. The total length of water carriage from Culladacoorchy to Tuticorin would thus be about 80 miles, and from Streevigoontum to Pinnacoil 17 miles, and from the former to Colasagraputnum 27 miles, total 124 miles, the general direction being from west to east. The branch channels from Streevigoontum to Tuticorin and Colasagraputnum have been estimated at about Rupees 5,000 per mile, the remainder of the line might be executed for half this sum including locks.

11. As respects railways neither Madura nor Tinnevelly are likely to benefit directly from that now in course of construction from Madras to Beypoor,

but I doubt not that a branch railroad to commence at Salem and proceed due south, viâ Caroor and Dindigul, and thence to Madura and Tinnevelly will eventually be found worthy of attention. Should the branch railway from Trichinopoly to Negapatam be constructed, it will have a great influence upon the traffic of the northern part of Dindigul, and make road No. 1, connecting the latter place with Trichinopoly, a very important thoroughfare. In time perhaps similar railways may be laid down on the cotton roads in Tinnevelly with advantage to the community.

12. As respects new works, or improvements to old ones, connected with irrigation, spoken of in para 81 of the Memo., I do not see that there is much room for such in Madura, except it be by damming up some of the mountain streams flowing from the Pulney range of mountains so as to form extensive reservoirs at their foot, instead of allowing them to run off like torrents, as they now do, in a day or two, filling a few tanks only in their progress and very frequently causing breaches in their bunds and injury to the public roads. The Vigay, which is the only river of any size in the Madura District, is fully turned to account for irrigation. Very little of its water ever finds its way to the sea, even in what may be termed favorable seasons, numerous channels being taken off it to supply the lands of Shevagungah and Ramnad after it has watered the Government talooks to the westward.

13. In Tinnevelly the principal openings for improving and extending the irrigation of the country which have presented themselves to my mind are, 1st, the construction of an anicut across the Tambrapoorney river at Streevigoontum, about midway between the Murdoor anicut and the sea, to supply two main channels, one proceeding in a north easterly direction as far as the port of Tuticorin, and to be continued eventually to the northward as far as the Vypaur or Sautoor river; and the other in a south easterly direction to Trichendore and Colasagraputnum. An estimate amounting to Rupees 3,59,172-5 for this work has been prepared and will be forwarded shortly for sanction. It is calculated that in addition to about 700 seed cottahs, or 1,120 acres, of "tursee" land under the several tanks, in the Punjamahl talook, at present supplied by the Mailacaul and Keelacaul channels from the Murdoor anicut, a further extent of partly waste and partly poonjah land, estimated at seed cottahs 4,000, or acres 6,400 on either side of the river may gradually be brought under wet cultivation.

14. In framing the estimate for this work I have had in view not simply channels of irrigation, for which a much less sum would suffice; but deeming it probable that ere long the coast canal may be extended to Tinnevelly, I

have thought it advisable to make them of such a section as will fit them for navigation as well as irrigation, and to allow for the necessary locks, bridges, &c., that will be required on each line of canal. I have also taken advantage of the anicut to throw a bridge across the Tambrapoorney at Streevigoontum, a work that is very much wanted, and which can be accomplished for a comparatively small sum in connection with the former work.

15. Another project which I have had in view is to turn some of the streams, which now run waste through Travancore, into Tinnevelly for the irrigation of the north western portion of the District, which now receives a very indifferent supply of water. I have heard of a likely place in the hills west of Shevagherry, and another above Kuddeanulloor, but my time has been, and is still, so much taken up with the ordinary duties of the Division, that I have not been able to satisfy myself by personal inspection of the feasibility, or otherwise, of these projects. A similar project in the hills west of Tricknangoody in the Vullyoor talook requires investigation.

16. In September last I examined the course of the Tambrapoorney above Paupanassum to ascertain if it were practicable to dam up its waters so as to form an extensive lake in the manner contemplated by the Committee and found what appeared to me a very eligible site for a dam. The breadth of the river was not more than 100 yards, the bed a mass of rock and the banks on each side rising abruptly to the height of 60 feet, completely shutting in the valley above. So that if the dam were raised to about the same height it would serve to retain a very large body of water. If necessary, a second dam might be formed about ¾ of a mile below the Paupanassum falls and thus secure a further supply of water for purposes of irrigation, as well as of navigation. But though all this may be practicable, it is difficult to form even a rough guess as to the expence necessary to carry into effect extensive works of this kind, situated as they would be at a distance from the populous parts of the District and in the midst of jungle, and with the scarcity of labour that one has to contend with in Tinnevelly. There can be no question that the benefit to the District would be very great if these works could be accomplished. The annual revenue to Government from the Tambrapoorney irrigation is about seven lacs of Rupees, or upwards of 50 per cent. of the whole wet revenue of the District. It would be a great matter therefore to secure this large extent of cultivation from drought, such as happened last fusly, (1263) whereby the loss to Government amounted to Rupees 1,83,616. The greater part of this would have been saved, if a supply of water had been forthcoming for the last month or six weeks of the cultivating season, "Câr" and "Peshânum."

17. The Committee have adverted in para 83, to the restoration of many old and breached tanks in Tinnevelly during the last ten and twelve years with considerable advantage to the people and the revenue. There are still several such tanks in the Sautoor and Ootapedarum talooks which might be restored to a state of efficiency with a prospect of good return for the outlay. One in particular, near Sevellapairy, on the left bank of the Chittaur, near where it falls into the Tambrapoorney, which was formerly supplied by an anicut across the former river, situated about a mile below Gaingoondan, is worthy of attention.

18. The ports on the coast of Madura and Tinnevelly are, with the exception of Tuticorin, simply open roadsteads, exposed more or less to the effects of the north-east and south-west monsoons. In Madura the principal sea-port is Keelacurry, 30 miles south of the Paumben channel. The long spit of land which runs out in the direction of Paumben shelters it a good deal during the north-east monsoon; and during the south-west monsoon vessels from Columbo can make this port when they cannot make Tuticorin. The deepening of the Paumben channel has materially improved the trade of Keelacurray, as well as that of Tuticorin, and when the further deepening recommended by Colonel Cotton is completed, Keelacurray will be a very convenient port for the shipment of treasure. At present it is shipped at Attengherry, on the northern side of the spit of land before mentioned, the depth of water there allowing the steamer to come much nearer the shore than it can opposite Tondi or Devapatnum, the two northern ports of Madura.

19. The inner anchorage of the port of Tuticorin in Tinnevelly is only suited to small vessels drawing less than 12 feet of water. For these it is very safe and convenient. Large vessels are obliged to anchor outside Hare Island, a distance of 4½ or 5 miles from the shore, in six fathoms water. A jetty is very much wanted at Tuticorin for the convenience of the public. At present bales of cotton and other goods are carried on men's heads for some distance through the water to the boats which are to convey them to the ships, whereby much time is lost and considerable expence incurred. This is the only work that I can suggest at present for the improvement of the port of Tuticorin. A similar work is needed at Colasagraputnum, situated 30 miles south of the above in a bay formed by the projecting head land of Manapaud, which shelters it on the south west. A considerable trade is carried on between Colasagraputnum and the ports on the western coast.

20. The other ports in Tinnevelly are Vypaur and Coilputnum. The former is situated at the mouth of the Vypaur, or Sautoor river, and in former days a good deal of cotton was shipped there in Dhonies for Madras. Since the

establishment of cotton screws at Chippeecolum, three miles south of the above, the trade has been transferred to that place, and there is very little business now done at Vypaur. Coilputnum is situated about 20 miles south of Tuticorin and carries on a small trade with Madras and Columbo, chiefly grain and piece goods. It is an open roadstead and not susceptible of any improvement.

I have the honor, &c.,

(Signed) W. H. HORSLEY, CAPTAIN,
*Civil Engineer 8th Division.*

CIVIL ENGINEER'S OFFICE, 8TH DIVISION,
TINNEVELLY DISTRICT,
VEERAPANDIENPUTNUM,
*9th May* 1855.

## LETTER FROM CAPTAIN F. H. RUNDALL, CIVIL ENGINEER 9TH DIVISION, TO SIR H. C. MONTGOMERY, BART., CHIEF SECRETARY TO GOVERNMENT, FORT SAINT GEORGE, DATED 4TH JANUARY 1855. No. 16.

SIR,

1. I have the honor to acknowledge the receipt of Extract from Minutes of Consultation, dated 28th September, together with the pamphlet No. 5, containing Selections from the Records of Government and entitled Collective Memo. on Public Works in the Madras Presidency.

2. In obedience to the orders of Government directing me to state my opinion regarding the projects proposed which affect my Division, as well as any suggestions for the improvement of the country under my charge, I beg to offer the following remarks.

3. The only project suggested particularly in the Circular Memo. directly affecting this Division is that of the coast canal. Perhaps in no part of the line could it be opened more quickly and with less difficulty than from the Chilka lake to the Calingapatam river, but from thence to Watada in the Vizagapatam District, the difficulties would be considerable. The channel would have to be carried somewhat inland at the back of the hills which jut out into the sea, and form the several bluffs and headlands which distinguish this portion of the Coromandel coast. To prevent heavy excavations it would be necessary to construct a great number of locks, and the supply of the water required for navigation would have to be obtained from large reservoirs formed in the range of hills lying about 35 miles inland. I question whether the communication might not be best effected by a slow speed railway between these two places, which are about 105 miles apart. This point of course can only be determined by a comparison of the relative prime cost, and the rate at which goods can afford to be carried so as to yield an equal return for the expenditure incurred.

4. I cannot give any positive information on this last, but from my knowledge of the country I think the least excavations would be an average depth of 10 yards which with the width proposed, viz., 20 yards would amount to 7,04,000 cubic yards ℔ mile, costing (at the rate of 1¼ ℔ cubic yard all round on account of the hardness of the soil) 55,000 Rupees. To this would have to be added the cost of the locks and large reservoirs, which would bring up the expence to 70,000 Rupees ℔ mile. The low speed railway might I think be laid for 12,000 Rupees ℔ mile. Though this calculation is not founded on as-

certained data, it yet may prove of some help to those who may be called upon to consider the question, and perhaps it might not be found altogether impossible to transfer boats bodily from the canal on to the rail in a way similar to which vessels are conveyed from low to high reaches in canals in Europe and America, where the construction of locks would have been attended with disproportionate expenses or unusual difficulty. If such could be effected it would of course save the inconvenience and expense attendant on shifting cargo. The formation of the coast canal through the Ganjam District would prove immediately useful and fall in with the projects I have already submitted for the consideration of the Board of Revenue in my report on the Ganjam District, in which I stated a project for establishing a water communication with the coast from Buttely a village on the banks of the Calingapatam river situated at the foot of these hills, and an emporium for the traffic which is brought from thence and from the neighbouring talooks in the Nagpore territory. The general outlines of this and other projects combining irrigation with navigation I have already stated to the Board, and will therefore only add here that I hope soon to have all the detailed plans and estimates ready for submission.

5. The Vizagapatam District from its natural features does not offer any opportunities for irrigation projects on an enlarged scale, as far as the only two talooks under the Collector's management are concerned, but it requires to have communications opened throughout its length and breadth, many of these have already been commenced, but the different Zemindars who possess large estates throughout the District have done but little as yet towards opening up their respective estates.

6. There is one project which I have long contemplated, but have never yet brought forward, as I doubted whether it lay within the province of Government to undertake it, but were the Government to countenance the scheme by guaranteeing a certain rate of interest, I have no doubt the requisite capital would be forthcoming to carry it out. This project is the construction of a slow speed railway from the town of Parvattipore at the foot of the hills bordering the Jeypore country, to the port of Bimlipatam. This line runs through one of the richest tracts in India, and along it some of the most valuable articles of export are conveyed such as jaggery, oil seeds, cotton, shell lac, and the wheat, which is now brought by the Bunjaries from Nagpore. The reason of my doubt as to how far it was the duty of Government to undertake the work is, that the country through which the line would run and which it would benefit, is entirely composed of the Zemindaries of Vizianagrum, Bobbily, Saloor, and Parvattipore, who it might be supposed would take measures to develope the resources of their respective estates, but even were they willing, it would be almost impossible to get them to combine together in carrying out any mutual scheme of improvement on account of the petty jealousies existing

amongst them on matters of etiquette, &c. It is moreover very difficult to persuade, and in fact scarcely to be expected from them where they have not yet had an example set them by the Government, that money spent in opening up communications, must, by rendering their tenants more prosperous, bring to themselves a greater measure of prosperity. But as soon as they find that money can be profitably invested with a guaranteed rate of Interest. I am quite sure they will readily invest their capital therein, and when once the fact is proved that the returns from such an undertaking are greater than the interest guaranteed by Government, the capital for all similar schemes will be readily provided.

7. It is only by some arrangement of this kind that the co-operation of the Zemindars in opening up the country comprising their respective estates will be successfully and certainly obtained. To bring this about, besides the amelioration of the people generally, the Government have a direct interest in the fact of the town of Parvattipore being the focus to which produce from Jeypore, Kalahundy and the neighbouring talooks of the Nagproe territory is attracted, and thence transported to the coast, and through which salt in return is transmitted into the interior.

8. The line I would propose to be first laid down should, starting from Parvattipore, pass through the towns of Bobbily, Gazapathynagrum, Vizianagrum and so to Bimlipatam, having a branch from Vizianagrum to the salt pans at Konada, and one from near Bimlipatam to Vizagapatam, unless the idea of laying a rail from Watada to Calingaptam instead of the coast canal be adopted, in which case the two lines would cross each other and obviate the necessity of a branch rail to Vizagapatam. From Parvattipore to Bimlipatam is about 65 miles, and from Vizianagrum to Konada 12 miles, say 80 miles of rail which I think could be laid for 12,000 Rupees ℔ mile on the plan of the American Roads, viz., with a bar of iron 1¼ inch square screwed down to sleepers, any quantity of which are procurable from the forests near Parvattipore. The cost of iron I reckon at 120 Rupees ℔ ton.

9. The cost of working this railway would according to Colonel Cotton's calculations be as follows.

| | | | | |
|---|---|---|---|---|
| 10 Per Cent. Interest on 12,000... ... | Rs. | 1,200 | 0 | 0 |
| Management........................... | „ | 100 | 0 | 0 |
| Repairs............................. | „ | 100 | 0 | 0 |
| Sundries............................ | „ | 300 | 0 | 0 |
| Total per mile per annum... | | 1,700 | 0 | 0 |

which would require a traffic of 4-10-6 per day on each mile.

10. The present cost of transit is under the most favorable circumstances in the dry weather $1\frac{1}{2}$ annas per ton per mile, and double that in the wet weather. If therefore the cost were diminished by $\frac{2}{3}$ and 6 pie charged, and if only half the daily charge is to be paid by goods, it would require a thorough traffic of about 74 tons per day. At this present time there is nearly one-fourth that amount carried in *salt* alone.

11. The remaining half charged to passengers would reckoning only the lowest class of passengers, travelling at the rate of 1 pie per mile, require but 450 persons to be passing to and fro.

12. The difference of level between the two extreme points as indicated by the Aneroid Barometer is somewhat under 400 feet, this would give an inclination of little more than 6 feet per mile, but as the intermediate country is of an undulating character there will of course be more cuttings and embankments than the mere difference of level between the two extremes would indicate.

13. It will be seen on a reference to the Map that Parvattipore is naturally the centre to which the traffic from the hills will be directed, as it is situated about midway between the two great rivers, the Godavery and Mahanuddy; while the distance from Bustar to the banks of either river is as great as it is to the Coast, viâ Parvattipore. Hence the great stream of traffic flows in this direction, and to diminish the cost of transit, for any portion of that distance is of course most desirable. There is no necessity why Parvattipore should be the terminus of the Railway; for, as far as I know, there is nothing to hinder its extension along the valley of the Naugoolea river to Ryagudda and eventually to Kalahundy, as the necessity occasioned by opening up the country may become apparent.

14. I think however I have pointed out enough to justify a further investigation of the project, and of its being brought prominently before the notice of the public; in order, if Government should so see fit, to give parties an opportunity of coming forward and investing their capital after a due examination has been made.

15. The next point which I beg to bring to the notice of Government is one which has been alluded to by the Committee, and that is the passes through the hills for the purpose of opening up the country above the ghauts, a tract which is of considerable importance.

16. Two of these have already been brought to the notice of Government by the Collector of Vizagapatam, three leading to Jeypore, and two into Kala-

hundy which belongs to Nagpore. Two of these lines I am now about to proceed and examine throughout personally; viz., that from Vizagapatam viâ Madugole, and the other from Parvattipore to Jeypore. The former has at the outset a difficult ghaut of 3,500 feet direct ascent to be overcome, the other has only ascents of from 600 to 1,000 feet at intervals before reaching the highest elevation. One pass in Kalahundy, I hope to have examined by one of my Assistants, and the other I must leave to another opportunity. These roads however, as at present proposed, run only for about 70 miles in length each, into the hill country. The point I am anxious to lay before Government is the desirability of extending the communication right through the unexplored tract of country lying between Jeypore and Nagpore. For this purpose a line should be carried to Bustar from whence a road should branch off by Wyraghur to Nagpore, and another to Ryapore, a large town situated on the mail road between Nagpore and Calcutta.

17. The route leading from Parvattipore to Kalahundy by Ryagudda should be continued through Singeepooram and Byragur to Ryapore, throwing off a branch to Bustar from Singeepooram, and one to Bissemcotta to join the line which should be made between Buttely on the Calingapatam river, and Sohunpore on the Mahanuddy. The accompanying sketch Map will explain the relative localities. These few lines would intersect this hitherto unexplored country, and render it comparatively accessible. Judging from what little is as yet known concerning it, and from the produce brought down the different passes, would lead to the belief that it is a country of considerable importance. I would beg therefore to suggest the propriety of appointing a special Committee of three Officers, one of whom should be a Medical man, for the purpose of examining not only the routes above specified; but the character of the country generally through which they pass, as regards all its capabilities, resources, and climate. I believe myself that the unhealthiness of the country generally has been exaggerated, and that the sickness which has hitherto overtaken all expeditions into the hills is confined to a comparatively narrow belt in the more immediate vicinity of the hills, and that were this small portion so opened up, as to allow of its being rapidly traversed, it would be found that the rest of the country was far from being unhealthy. I am of opinion also that these expeditions have been ill-timed, and that were they not undertaken till the middle of the month of January, the hills themselves would be found habitable until the setting in of the rains.

18. All the Officers composing the expedition should be men of some scientific attainment and pursuit, whose inclination would naturally lead them to the pleasure attendant in exploring a new tract of country. They should also be liberally remunerated for their duties, and provided with Elephants for

the carriage of their baggage, on account of the difficult nature of some parts of the country to be traversed, and as the peculiarities of the climate have yet to be fairly tested, it would of course be necessary that one of their number should be a Medical Officer.

19. I trust I shall not be considered to have trespassed beyond the sphere of my duties by the above remarks, for though the country is not comprehended within the limits of my own Division, yet from its being contiguous to it, any projects undertaken therein, *must* have a bearing more or less direct on works prosecuted here, especially with reference to the communications. The importance of the Railway from Parvattipore to Bimlipatam, and the water communication from Buttely to Calingapatam and Nowpauda salt pans, is rendered more conspicuous, when viewed in connexion with the opening of the country beyond. By lessening the cost of transit, and causing an increased activity, a more frequent intercourse between the people of the hills and the plains will be established, which cannot but be attended with the most beneficial results.

20. These matters I have laid before Government direct not being aware how far I am permitted to communicate with the Authorities in Nagpore on the subject. Whatever is undertaken should of course be done in communication with them, and all the records, surveys, and routes hitherto made of any part of this territory to be examined, should be procured for the use of the Officers proceeding thither.

21. In conclusion, I beg to apologize for the length of these remarks, but I trust the importance of the subject will plead my excuse, and that the suggestions set forth may not be unacceptable to the Government.

I have the honor, &c.

(Signed) F. H. RUNDALL, CAPTAIN,
*Civil Engineer 9th Division.*

CIVIL ENGINEER'S OFFICE, 9TH DIVISION,
CAMP AT WALTAIR,
*4th January*, 1855.

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